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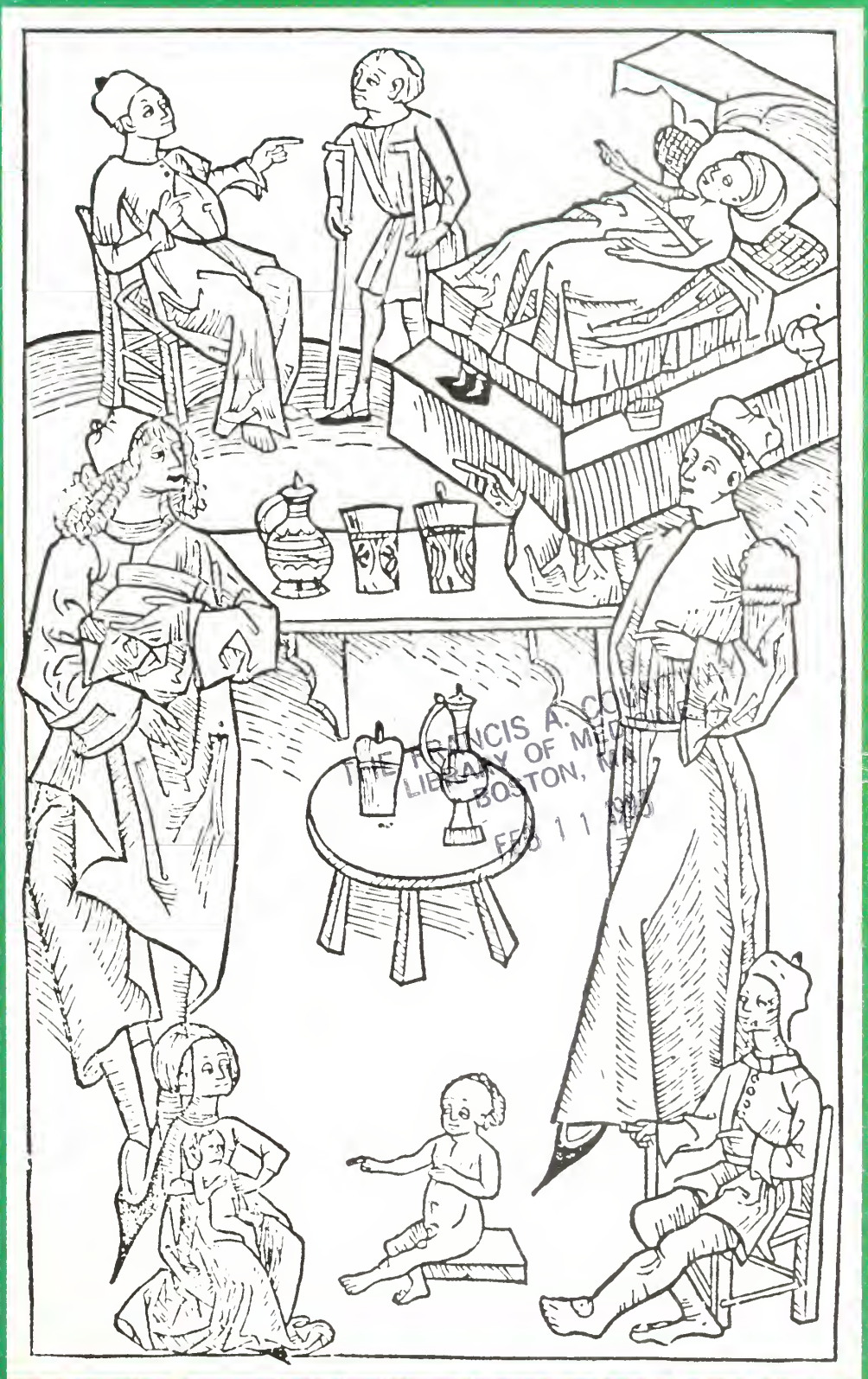
Rhode Island
MEDICINE

February 1993

Volume 76, Number 2



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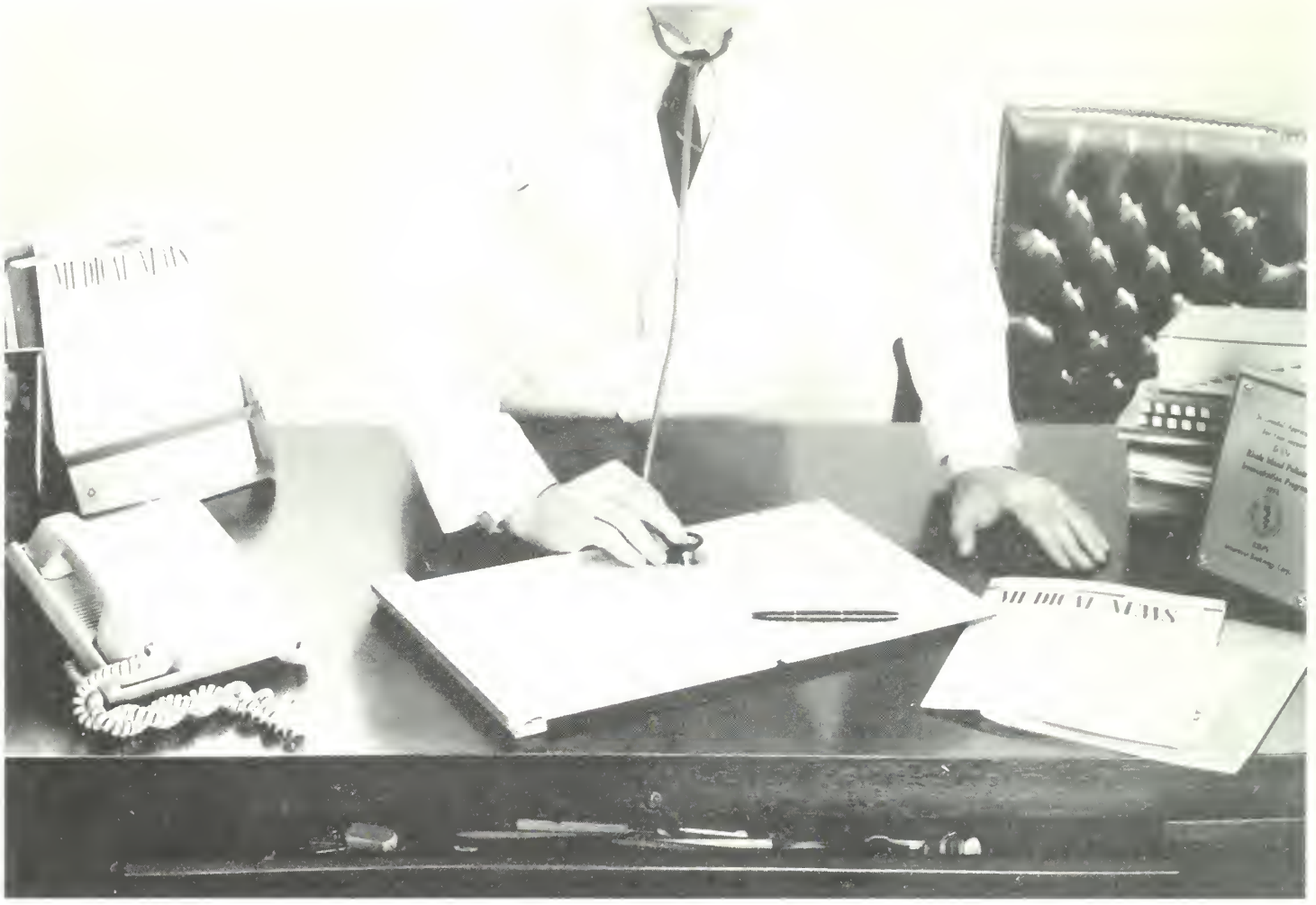
# Medicine and Religion



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Publication of the Rhode Island Medical Society


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**Cover:** 15th century woodcut depicting the practice of medicine

**Rhode Island Medicine** is owned and published monthly by the Rhode Island Medical Society, 106 Francis Street, Providence, Rhode Island 02903, Ph: 401-331-3207. Single copies $4.00 — Subscriptions $40.00 per year (members of the Rhode Island Medical Society — $5.00 annually). Published articles represent opinions of the authors and do not necessarily reflect the official policy of the Rhode Island Medical Society unless clearly specified. Advertisements do not imply sponsorship or endorsement by the Rhode Island Medical Society. Second class postage paid at Providence, Rhode Island. **ISSN 1061-222X.** POSTMASTER: Send address changes to RHODE ISLAND MEDICINE, 106 Francis Street, Providence, RI 02903. National Advertising Bureau: State Medical Journal Advertising Bureau, Inc., 711 South Blvd., Oak Park, Illinois 60302. Phone 708-383-8800.

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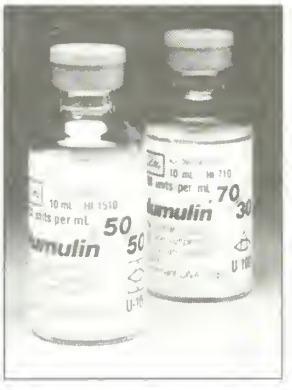


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# COMMENTARIES

### Two Ministries

This issue of *Rhode Island Medicine* provides a rostrum for those clergy and physicians who nurture the hope that their separate goals may be realized through mutual cooperation. The mandarins in each of these two ancient professions will decry such minglings, either as acts of heresy or departures from rational action. But most practicing clergy and physicians know well that their congregants and patients are often aided materially and spiritually when this cooperation is earnest and unhindered.

The six separate essays in this issue offer curiously similar messages: Each author, using very personal words, attempts to distinguish miracles from mysteries and seeks to approach the unknowable with commitment tempered by humility; all affirm the patient as the sole determinant of success.

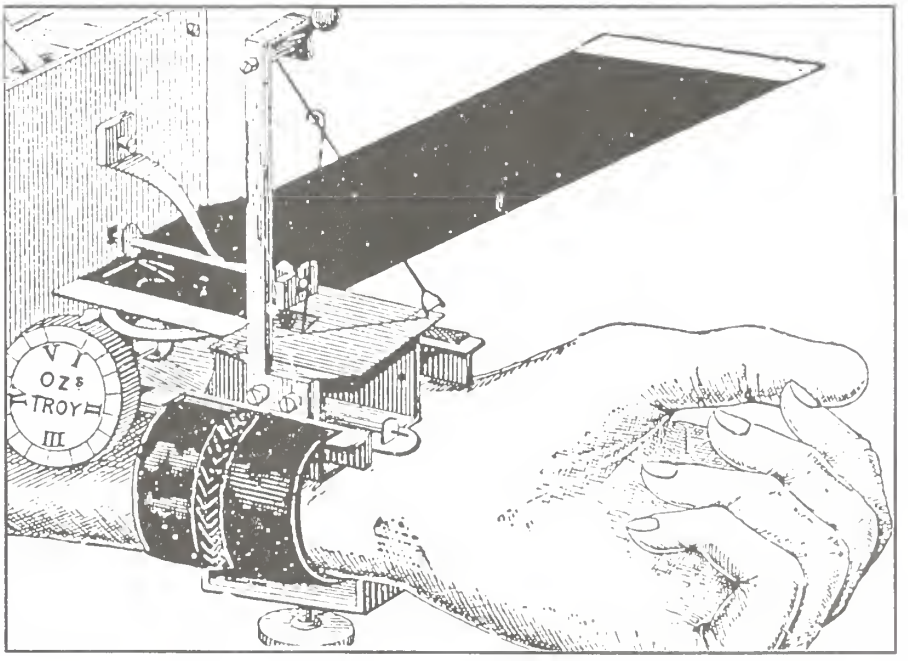
Some 18 years ago, the Brown medical school, seven of its teaching hospitals, the Roman Catholic Diocese of Providence, the Rhode Island Council of Churches, the Rhode Island Board of Rabbis, and now Hospice Care of Rhode Island, joined to create an ecumenical organization where issues of mutual concern to medicine and religion might be confronted and where hospital chaplains could be trained by both clergy and physicians. This entity, called Interfaith Health Care Ministries, is now a flourishing enterprise, training the bulk of institutional chaplains in southern New England. Since its origin in 1974 more than 500 ordained clergy have been educated rigorously in clinical pastoral education by Interfaith. The hospital chaplains-in-training participate fully in the ethics boards of the hospitals, work closely with attending and resident physicians and conduct some 25,000 bedside pastoral visits per year. The program's executive director is Rev William F. Nisi, and the director of clinical pastoral education is Sister Dorothy Cotterell. Those interested in further information may contact Interfaith by calling 444-8356.

### And the Beat Goes On

In the beginning there came an awareness that certain external signs signified aliveness. Next, these visible manifestations of life – the vital signs – were found to vary considerably in rate and quality, consistently departing from the norm when associated with disease. And finally, there arose the realization that all the wondrous adjectives describing the peripheral pulse, the respirations and the body temperature paled before the bounty of diagnostic information imparted when these vital signs were measured objectively, when some numeric scale was assembled and applied.

The word *pulse* conveys an emphatic sense of power, incessant throbbing and aliveness. Pulse is at the core of such assertive words as compulsive, repulsive and propulsion. Pulse is a metaphor for time and, when we take the pulse of a nation, a symbolic insight into our wishes and hopes. A beating pulse is likely our most primitive, vivid symbol of aliveness. It says to the observer that life – with all its mysteries, wonderments and threats – still flourishes. Shakespeare's King John, in seeing naked power, asks: "Have I commandment on the pulse of life?" Indeed, the pulse is more than a mere symbol, it is the very currency of life.

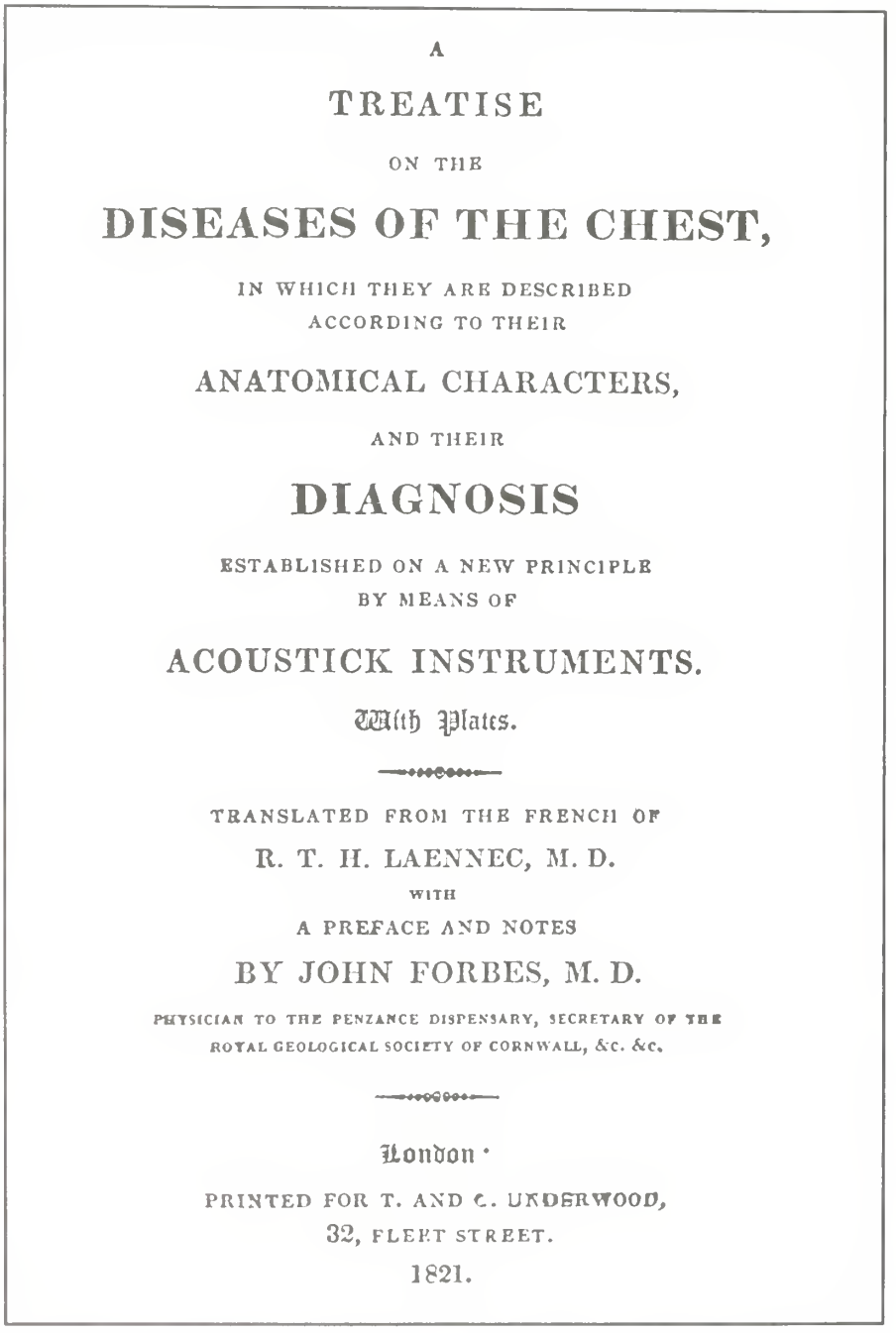
No classical school of medicine has ever ignored inspection of the pulse. In the Chinese art of medicine, pulse examination forms the critical center of



physical diagnosis. There was early recognition, particularly in the West, that the pulse might yield hints about the vitality of the patient. In the Hippocratic writings, one finds a dissection of the pulse beat into the biphases of *sphygmos* and *palmos*. Subtleties such as the dicrotic pulse also are described in the Hellenic period. In the sure knowledge that there was much to be learned by manual palpation of the peripheral pulse, studies were undertaken on such tangible qualities as rate, strength, regularity, lapses, rhythmic patterns, compressibility and volume. Galen's extensive descriptions of the human pulse declared, however, that there were only three attributes worthy of record: size, frequency and speed of flow. The phase of arterial expansion he termed diastole, and arterial collapse, systole representing a reversal of the current meanings to these terms. The concordancy between pulse beat and left ventricular contraction was not fully clarified until the work of Harvey.

Descriptions of the pulse tended to be confined to certain qualitative attributes until some rate-determining techniques could be contrived. Thus, in earlier texts, we had pulses described as angry, ardent, bigeminal, dicrotic, febrile, formicant, incisural, irregular, paradoxic, thready, and vermicular. Some of these descriptive titles bore little specific pathophysiologic significance; others were gradually linked to certain underlying lesions. Aortic regurgitation, with its large amplitude of pulse pressure generated a pulse with a water-hammer effect, sometimes called Corrigan's pulse. The pulse pressure may become so great in insufficiency of the aortic valve that a capillary pulsation beneath the fingernail becomes visible (Quincke's pulse).

The first text devoted to a quantitative appraisal of the pulse is probably Joseph Struthius' monograph of 1555, *Ars Sphygmica* (Greek *sphygmos*, pulse). The pulse beat is now depicted graphically, the aim being to translate the tactile impression to an objective visual record. Struthius counted 100 beats of the radial pulse while a water-clock (*clepsydra*) was running and he then weighed the accumulated water.



A

TREATISE

ON THE

DISEASES OF THE CHEST,

IN WHICH THEY ARE DESCRIBED
ACCORDING TO THEIR

ANATOMICAL CHARACTERS,

AND THEIR

DIAGNOSIS

ESTABLISHED ON A NEW PRINCIPLE
BY MEANS OF

ACOUSTICK INSTRUMENTS.

With Plates.

TRANSLATED FROM THE FRENCH OF

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A PREFACE AND NOTES

BY JOHN FORBES, M. D.

PHYSICIAN TO THE PENZANCE DISPENSARY, SECRETARY OF THE
ROYAL GEOLOGICAL SOCIETY OF CORNWALL, &c. &c.

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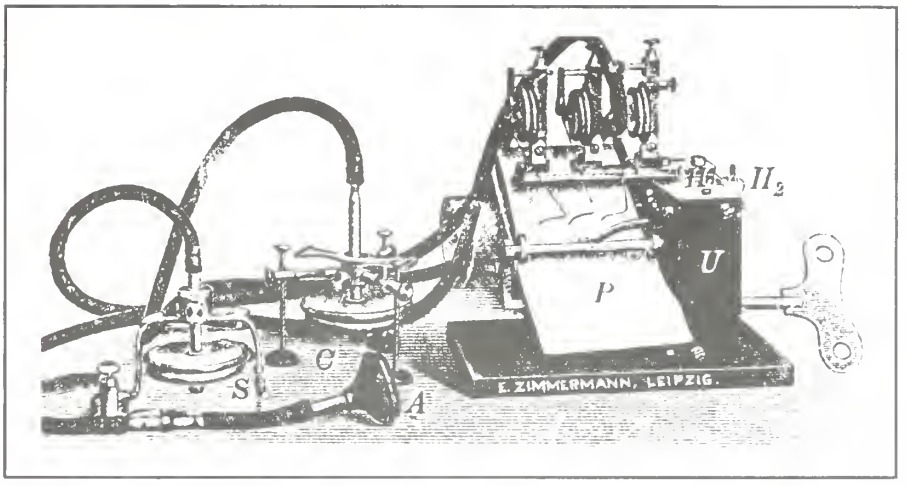
1821.

Time, therefore, was the variable; and the faster the pulse, the less the reported weight of water. This system seemed counter-intuitive and a new empiric measure was devised: the number of palpated pulse beats counted in the space of 30 minutes, calibrated by means of a water or sand clock. Thus, before the 17th century, quantitated pulses were commonly expressed as frequencies per 30 minutes of observation, a tribute certainly to the staying patience of the practitioner. Harvey's description of pulse rate in *De motu cordis* was also defined as beats per 30-minute intervals. He suggested that the normal value was 2,000 pulsations per 30 minutes (ie, 67 per minute).

Galileo, in 1582, used the swing of a cathedral pendulum as an objective criterion to count his pulse, but it wasn't until Santorio's pulsilogium, a 1625 invention, that an instrument was designed expressly to determine pulse rate. The device consisted of a portable pendulum, the arm length of which could be




varied. The observer regulated this pendular length until it coincided with the pulse beat; he then recorded this length, which was, of course, inversely proportional to the pulse rate. The shorter the length, the faster the pulse rate.

In 1707 John Floyer instructed a clock-maker to assemble a portable watch incorporating an additional hand, which rotated fully each 60 seconds. This new instrument was called the pulse-watch, and it rapidly became an essential diagnostic tool. Sequin called it "the beacon of physicians." With the pulse-watch the rate could now be numerically recorded.

In Laennec's 1821 treatise on the disease of the chest, he describes in great detail the rhythms, irregularities and intermissions (ie, dropped beats) of human pulsation.

Other characteristics of the peripheral pulse still awaited appropriate instrumentation. Austin Flint, the 19th century American cardiologist noted: "It is evident that few of the characteristics of a pulsation, occupying as it does a 70th part of a minute, can be ascertained by the sense of touch alone." Many attempts were now begun to record graphically the radial pulsation. It was known for centuries that one could, for example, observe the pulse beat from across the room by placing a dried leaf upon the radial surface of the wrist. Physiologists now constructed instruments consisting of a delicate lever which was moved by the amplitude of the arterial expansion; this barely perceptible systolic thrust was augmented by extending the other limb of the lever and allowing its excursions to be recorded on a kymograph. These recordings, called sphygmographs, demonstrated arrhythmias, extremes of pulse pressure, and such subtleties as anacrotic, dicrotic and bigeminal beats.

The design of this instrument was further refined when a time scale was added to the tracing. It was now called a polygraph and was used extensively by pioneer cardiologists such as Paul D. White and Thomas Lewis. A contemporary of theirs, James Mackenzie, was deeply skeptical of the value of such instruments in the practice of medicine, contending that they necessarily displaced the essential elements of auscultation, percussion and the meticulous inspection and palpation of the peripheral pulse. Medical historians will point out, of course, that the discovery of new gadgets such as the clinical thermometer and the stethoscope had been similarly deplored, and for similar reasons. In this instance, though, Mackenzie seems to have been correct. With all of the technical skills invested in improving the mechanical polygraph, it generated few clinical insights and the instrument can now be found only on the shelves of medical museums. All that engineering activity reinforced the axiom that intense activity should never be confused with progress. The electrophysical and radiological components of cardiac activity turned out to be the more fruitful avenues of inquiry.

Stanley M. Aronson, MD

**Better Than Precious Ointment**

We are taught that there is nothing higher to be cherished than the sanctity of ones' own good name. Probably true; but many would contend that an illustrious name is more likely to outlive its owner when it serves to define more than its bearer, when it has been transformed into a generic term. Historians note that when a personal name is converted to adjective, a class noun – even a verb – it serves to confirm the notable accomplishments of its owner. We are all seekers after modest honors – promotion, election, increased income – but these goals are petty when compared with the rare honor of having one's surname promoted to an adjective. Plato, for example, was an established, respected teacher – until someone discovered the universality of platonic relationships; and then there was no one to deny him enduring immortality. This fame becomes even more awesome when the name is no longer capitalized. Behavior, for example, which is described as calvinistic seems to carry greater gravity and universality than if it were referred to as Lutheran or Wesleyan.

Among our 42 separate presidential names, only a handful have been elevated to adjectival status. Some, such as Jackson and Jefferson, have had the adjectival suffix, *-ian,* added. Occasionally, the more pejorative suffix, *-ite,* as in the case of Reagan, Clinton or Nixon, has been appended. For unclear reasons, only Lincoln has inherited the suffix, *-esque.* This is derived from an Italian suffix, *esco,* meaning, in the manner of, and is akin to the English, *-ish,* (as in English). None of the seven US Presidents with names of one syllable has yet to be promoted to the ranks of adjectives.

The suffix, *-ic,* is occasionally used, as in galenic, faradic, byronic, and napoleonic. The suffixes, *-ial* and *-ine* are attached, for the most part, to mythic names such as mercurial or saturnine. The suffix, *-ly,* conveys the same meaning, but somehow it has not been adopted.

In classical music, the names of few composers have been metamorphosed

into commonly employed adjectives. Wagnerian and Mozartian come to mind. Bacchanalia, of course, is inadmissible. Transformation to a collective noun is somewhat more common (eg, Mozartiana, Rossiniana).

In great literature, too, this is an honor bestowed upon but few authors. Rabeliasian, Homeric, Shakespearean, Byronic and Shavian are amongst the better known forms. No American writers have yet achieved this high station (well, perhaps, Faulknerian). Some immortal authors such as Cervantes and Goethe have not been granted the adjectival laurel, even though their fictive inventions (eg, quixotic, faustian) have arrived.

The Latin form of a name may become the root of the generic adjective. Thus, the partisans of King James (in Latin, *Jacobus*) were called Jacobites and the thoughts of Descartes (in Latin, *Cartesius*) were called cartesian.

The biological and medical sciences are equally stingy in dispensing these adjectival honors. Foremost and deservedly so, is Darwin; but there also are such transformations as pavlovian, Jungian, Jacksonian (as in seizures) and of course, freudian. In terms of public relations, it appears that the neuropsychiatrists are far more effective than are their sister disciplines. The penultimate honor comes when the name is remolded into a verb. To pasteurize is one of the very few to survive for more than a century.

There seem to be few reliable rules of grammar in this process of verbal beatification. If the name ends with an *-es* preceded by a consonant, this terminal syllable is dropped and an *-ic* is added (eg, Hippocratic, Socratic). If the name ends in a vowel, then add an *-nic* (eg platonic). There are negligible differences in meaning among *-ic, -ian, -iac, -ial,* and *-ly,* and the choice seems to be randomly determined. The suffix, *-ite,* however, denotes an advocate of, and therefore might be unflattering (eg, hitlerite). Names composed of four or more syllables, no matter the degree of genius, offer too much of a mouthful to graduate into commonplace adjectives (eg, Michelangelo, Archimedes, Paganini). The ideal combination seems to be a name of two syllables ending in the letter *n*.

Conversion to a noun of measurement, such as in volt, ampere, roentgen or curie seems to represent the highest possible honor. While the names of physicians have been commonly appended to organs, signs, diseases and processes (eg, Golgi apparatus) not a single Nobel Prize winner in medicine has been elected to the realm of the adjective since Pavlov, in 1904.

Stanley M. Aronson, MD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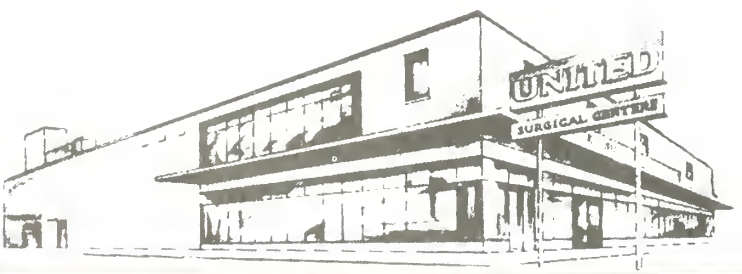


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# EDITOR'S MAILBOX

To the Editor:

The Division of Health Education (DHE) at Memorial Hospital of RI has received two research grants from the National Heart, Lung and Blood Institute of the National Institutes of Health. Both research projects involve cholesterol screening throughout Rhode Island and southeastern Massachusetts. The first project, entitled "Cholesterol Change at Work," involves conducting cholesterol SCOREs (Screening, Counseling and Referral Events) at 30 large worksites. The SCOREs either will be conducted by DHE staff or by occupational nurses within the worksites who have been trained and certified by DHE staff. The second project entitled Minimal Contact Education for Cholesterol Change involves DHE staff conducting cholesterol SCOREs in worksites, churches and other religious organizations, public sites such as supermarkets, pharmacies and medical sites such as public health clinics. In both projects, various educational approaches including face-to-face counseling, computer counseling, written materials, self-help kits, and an audio intervention using compact disk technology will be tested.

The purpose of these projects is to determine the most cost-effective method(s) for identifying individuals with high blood cholesterol, encouraging them to see their physician and motivating them to make dietary changes. The SCORE approach does not diagnose and treat individuals, but rather educates individuals about cholesterol and diet and refers them to their physician for confirmatory cholesterol testing and treatment. For individuals who do not have a regular physician, we provide names of area physicians willing to treat patients with high blood cholesterol levels.

We are currently looking for physicians throughout Rhode Island and southeastern Massachusetts who would be willing to include their name, office address and phone number on a physician referral list for use at cholesterol SCOREs in these two research projects. This list will be given to individuals with high blood cholesterol (≥ 249 mg/dl or ≥ 200 mg/dl with existing CHD and/or two CHD risk factors) who do not currently have a physician. The SCOREs will occur from March to June 1993 and from October 1993 to April 1995. Any physicians who are interested in including their name on the referral list can call Mark Messina at (401) 729-2432 as soon as possible. Thank you for your help in our research endeavors.

Richard A. Carleton, MD
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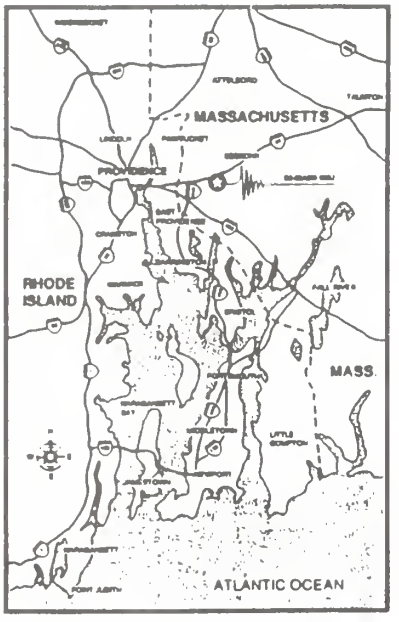


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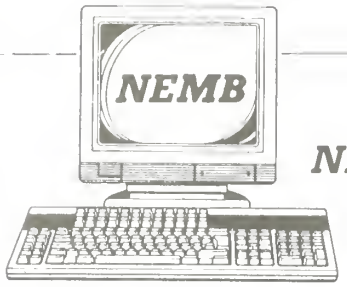


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# Medicine as Ministry: Reflections on a Chaplaincy in India

Rev David F. Shire

***Guilt, and the awareness of the dreadful injustice of poverty, become part of the daily experience for Westerners.***

Community Health and Development (CHAD) is one of the outreach programs of the Christian Medical College and Hospital in Vellore, India. CHAD, alone, serves 90,000 persons, living in 68 villages, 40% of whom are illiterate and live below India's poverty line. CHAD provides health care, education, and social and economic development. As part of our extensive orientation that first week of our 4-month sabbatical, we were taken to CHAD's "Ulcer Clinic." For the first time, we saw the stubby, toeless feet, the crumpled noses on the lumpy-skinned faces, and the deformed hands. The attendant used long, cotton swabs to dab salve on the open sores. The enormity of what we were watching took a few minutes to register: this was leprosy! Signs dot the highways: "LEPROSY IS CURABLE – TREATMENT IS FREE."

In the April heat of Tamilnadu, in southern India, the countryside has more shades of green than a box of Crayolas, and the Hindu culture permeates daily life. At the heart of the city of Vellore, 135 kilometers (84 miles) west of Madras, is the Christian Medical College and Hospital, known throughout southern Asia as CMCH. Patients travel by train 4 and 5 days and nights from as far away as Assam to be treated here. Virtually every medical specialty is represented. Each day 3,000 outpatients are seen, in addition to the 1,700 inpatients, served by a staff of 4,100 in addition to their physicians. If those numbers aren't staggering enough, each inpatient brings one or more family members to cook food and to provide care and comfort in addition to that provided by a well-trained nursing staff. The open space in front of the hospital is filled with people day and night, and the corridors teem with humanity eating, sleeping and waiting.

The buildings ramble over scores of urban acres on which live many staff and visitors. Outside the whitewashed walls of the hospital compound, bullock carts compete with rickshaws, lorries, automobiles, bicycles, buses; the wandering goats, cows, mules and pigs grub for food in the alleys and streets of Vellore. Masses of people crowd the Covered Market and the Long Market behind Officers' Line, a name left over from the Raj, 1 mile of shops partly facing a large urban park that boasts a mosque, Hindu temple and a Church of South India on its ancient grounds.

Three miles away in the relative quiet of India's countryside is the 200-acre campus of the Medical College, which teaches virtually every discipline needed to staff medical, surgical and research programs. In this academic year there are 489 nursing students, 202 in allied health services, and 615 in undergraduate and graduate medical programs.

Before the turn of the century Ida Scudder, the daughter of an American medical missionary, was growing up in South India. She agonized over the women who, because of religious and cultural taboos, refused to allow male physicians to treat them. Too many died needlessly. She resolved then to become a physician and returned to the United States where, in 1899, she was one of the first women graduates from Cornell Medical School. Back in Vellore she founded a one-bed clinic for women in 1900, and 2 years later opened a 40-bed hospital for women, which has grown into today's vast teaching hospital and research center.

Since it was clear from the beginning that poor people in the outlying villages could not get to the hospital,

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***ABBREVIATIONS USED***

***AA: Alcoholics Anonymous***
***AIDS: Acquired immune deficiency syndrome***
***CHAD: Community Health and Development***
***CMCH: Christian Medical College and Hospital***
***CT: Computerized tomography***
***ECT: Electroconvulsive therapy***
***MRI: Magnetic resonance imaging***
***RUHSA: Rural Unit for Health and Social Affairs***

Dr Scudder developed mobile dispensaries. In 1948, Dr Victor Rambo transformed the dispensaries into the famous Mobile Eye Hospital or "Eye Camps," where hundreds of patients would line up for exams and where cataract surgery was performed "roadside." The hundreds of patients still line up today, but those primitive outreach clinics have grown into full-blown community development programs, providing not only ophthalmological services but medical and surgical care, and agricultural and job training for the villagers. The Rural Unit for Health and Social Affairs (RUHSA) reaches out in one direction and CHAD in another, while the new Schell Eye Hospital provides state-of-the-art diagnostics and treatment for 100 inpatients and 350 outpatients each day.

My wife, Caldy, a rehabilitation instructor at IN-SIGHT in Warwick, spent much of our 4-month sabbatical at CMCH helping the staff of the eye hospital and occupational therapy department explore visual rehabilitation possibilities for the scores of blind and visually impaired scattered around the outlying villages. In the Hindu culture, disability is often perceived as a curse or retribution for sin. Cataracts are the primary cause of blindness in India. Yet, many persons who are visually impaired do not use or even know about national programs that provide cataract surgery, prevent blindness and provide rehabilitation. With the cooperation of Dr Ravi Thomas, who heads the Schell Eye Hospital, Caldy observed the enormous contrast between the diagnostics and surgery in the M*A*S*H-like rural settings and that provided in their state-of-the-art eye hospital in Vellore. With occupational therapists, Caldy was able to explore rehabilitation options appropriate to the culture and to encourage attitudinal changes in the offering and delivery of rehabilitation services.

It's a 15-minute walk from our stone and cement bungalow, across the Medical College campus, to the Department of Psychiatry and its Mental Health Center. Sixty-nine inpatients are treated in an open program, housed in motel-like units, each with India-style cooking and toilet facilities. One important requisite for admission is the presence of a close family member to participate in the treatment program with the patient. The commitment of family members is significant. The parents of a 12-year-old patient left their jobs for more than 2 months to be part of their son's treatment program. They said that any sacrifice was worth his recovery, and their present job was to learn their role in it.

***In the Hindu culture, disability is often perceived as a curse or retribution for sin.***

The General Ward at the Mental Health Center houses six patients in a large, square building with wood-burning cooking facilities in a separate room at the rear. As in other parts of the hospital, family members sleep on palm mats that are rolled up from the floor and tucked away each morning. On my first day of rounds, I greeted the aging mother of a patient, as I had most others, with the traditional Indian greeting, placing my hands together and offering a slight bow. Instantly she fell to the ground and began kissing my feet. Embarrassed, I lifted her and asked the psychiatrist next to me to explain that I was the new chaplain and, in my tradition, she and I were sister and brother. After a brief ex-

change in Tamil, the doctor explained that she was overwhelmed because in her entire life it was only the hospital staff that treated her with respect.

In the Mental Health Center, many of the patients are fluent in English. As chaplain, I was assigned to specific cases, especially those with substance-abuse issues. Because of the informal nature of the center, other patients, English-speaking or not, often would approach to share a visit. Language was sometimes a problem, but one's religion was never an issue. I was welcomed by Hindu, Muslim and Christian alike, with the Christians, of course, being a minority of patients treated in all departments of the hospital. There are 12 full-time chaplains at the hospital, led by the Rev Dr George Issac, Dean. Among them, the chaplains speak most of the 15 major languages of the country. They serve not only the patients, but also the hospital staff which is predominantly Christian. My role as chaplain to the Psychiatry Department was not only to deal with the spiritual issues of the patients and staff, but also to reinforce treatment plans and especially, in the case of substance abuse patients, the need for detox and the beginnings of AA's 12-step program. Since AA groups are not available in that part of India, the hospital provides post-discharge group sessions for all of its substance abuse patients.

My first patient was a highly manic young teacher who, when told I was an American, recited Robert Frost's "Mending Wall" every time she saw me on the campus.

Hair is a symbol of beauty for the women of India. One of our psychiatrists had a thick, black braid all the way down her back. For her and others on the staff, the 16-year-old girl who was a hair-puller became a challenge. After chatting with her five or six times during rounds, to the amazement of her parents, she asked if I'd like her to remove the kerchief that covered her head day and night. With great pride she showed me the beginnings of new hair growing, about the length of my well-trimmed beard. Before she left, her hair was long

enough to brush. Her problems began when she discovered that she had been adopted as an infant. Many overburdened mothers give children to more affluent family members to raise as their own. Girl babies are considered a special burden in India, requiring costly dowries when marrying. We often heard that educating a girl-child is like watering your neighbor's garden. But, judging from the large number of young women studying medicine and allied fields, many families were most willing to "water their neighbor's garden."

***One important requisite for admission is the presence of a significant family member to participate in the treatment program with the patient.***

Following an early morning lecture, two treatment teams begin rounds, standing in a semi-circle on the edge of each 20-unit cluster. Patients are reviewed by staff members from occupational therapy, social work, nursing, psychology and the attending psychiatrist or resident. In-depth presentations on the patients are made regularly, often led by Dr Jacob John, professor and head of the Department of Psychiatry. At each room, the patient emerges with the family member(s) to discuss treatment and progress with the doctor and other staff. These conversations are warm and intimate, punctuated with touching and occasional hand-holding, gestures very much in tune with the local culture.

Health insurance is virtually unknown, and only a few large corporations bear the cost of health care for their management and technical staffs. Patients must pay for their own treatment. In the Mental Health Center, as in all departments of the hospital, no one is turned away. But those who can pay help subsidize those who cannot.

The financial restraints and endemic poverty require a special emphasis on medical economics: the cost to the patient of every medication and treatment is carefully weighed and analyzed. Medical students have regular seminars and do research projects in medical economics.

Electro-convulsive therapy (ECT) is widely used in addition to drug therapy, psychotherapy, behavior modification, occupational therapy and group sessions. The short supply and cost of anesthesiologists led to ECT being administered without anesthesia. A 10-year study by five staff members, currently led by Dr Prathap Tharyan and involving over 10,000 individual treatments, was presented at the India National Workshop on ECT in 1990. Their study concluded that the dangers of skeletal injury from unmodified ECT are far outweighed by the benefits and cost factors of administering ECT without anesthesia.

Dr Jacob John and his staff are in the forefront of AIDS education in India. He has developed an AIDS education program for social workers, psychologists, students and clergy who come to the mental health center for his day-long program of factual information and case studies dealing with culture-related ethical issues: eg, should a man who tests HIV-positive and whose marriage is being "arranged," make his condition known? When do the rights of privacy collide with the rights of his potential bride? The HIV infection rate is staggering. According to Indian government sources, the 200,000 prostitutes in Bombay alone have the capacity to infect 600 men with AIDS each night. Dr John observes that one additional tragedy of AIDS for us in the United States is its primary association with

homosexual men, when worldwide it is a heterosexual disease and needs to be recognized as such by the American public and its government. Another major concern is the reticence of doctors to treat persons with AIDS, in a country where leprosy has been such a widespread and feared affliction.

It was at CMCH's Schieffelin Leprosy Research and Training Center that Dr Paul Brand and his staff pioneered the reconstructive surgery that provides some semblance of normalcy for those who are cured of this disfiguring and dread disease. Because of the stigma that still marks persons who once had leprosy, CMCH provides an innovative program of rehabilitation called "Care After Cure" to help integrate former patients into community life.

Since medical doctors are the administrators of most of the hospitals in India, and administration is not generally part of their educational experiences, CMCH has joined with Tulane University in developing a Postgraduate Diploma Program in Hospital Administration. It was my privilege, during our stay, to be one of their guest lecturers, discussing aspects of Rhode Island's health care system and presenting case studies with two different groups of doctor-managers. With the onset of high-tech medicine, they are certain that in the next decade they will be facing the same moral and ethical issues we face in the West today. Rhode Island's experience in introducing CT scan, and a decade later MRI, provoked significant discussion on the ethics of access among physicians who have little current access to such technology.

Discussions of ethical issues permeate the daily life of the hospital. Each of the staff, from sweepers to surgeons, participates in weekly study sessions based on the book *Alpha and Omega, Ethics at the Frontiers of Life and Death* by the Rev Dr Ernlé W.D. Young of Stanford University.

The physicians and support staff at CMCH could earn significantly higher salaries in private practice or in the growing number of for-profit hospitals across India. It is commitment to their religious faith and to the historic Christian philosophy and purpose of the hospital that keeps most of them at CMCH. Yet, some do succumb to the high salaries and Western life-style that is easily achieved by those who are well-trained in any of the medical disciplines. The brain drain is of constant concern at both the hospital and the medical college.

***Health insurance is virtually unknown and only a few large corporations bear the cost of health care for their management and technical staffs.***

The challenge of ethical decision-making is constantly before the medical community in India. Medical Colleges and Their Ethical Responsibilities was the theme of the 4th General Meeting of the Faculties of Christian Medical Colleges held in Bangalore in February 1992. Much of the conference was devoted to the initial development of a joint curriculum on medical ethics. The conference was especially appropriate in light of newspaper reports on the proliferation of for-profit medical colleges, the ethics of their enrollment criteria and the questionable qualifications of some of their graduates, a concern that deeply troubles the medical community. Profit permeates much of India's private medical care. Since the onset of kidney transplant programs in India, poor people have been willing to sell their kidneys. One kidney is worth several years' income to a struggling family. In a market that ranges from the Middle East to the Pacific Rim, there are many physicians who feel that payment for kidneys is an appropriate response to the growing need. Faced with pressure from patients with kidney disease, and a burgeoning black market, CMCH developed clear protocols requiring donors to be provable family members or verifiable close friends of the patient, with no payments of any kind for body parts.

While waiting for the van at one of the hospital's outreach clinics, two women wearing drab, worn saris approached me. One grabbed my feet and started to unlace my sneakers. Startled by her aggression, I shrugged her off with an uncomfortable half-smile and that universal nod that says "No!" Leaving, they looked back at me as if to say, "It was worth a try." In such poverty and deprivation, everything is worth a try in India! Guilt, and awareness of the dreadful injustice of poverty, become part of the daily experience for Westerners.

We were only two of a constant stream of volunteers to CMCH, who come from all over the world to teach, learn and share in this vast healing enterprise. A guest ophthalmologist from Chicago was lecturing while his wife, an accomplished artist, was painting colorful animals from Noah's Ark on the once-drab walls of the children's ward at the eye hospital. Audiologists from New England arrived with testing equipment and nearly $25,000 worth of modern hearing aids, until now unavailable except to the very wealthy. A surgeon from Oman came to observe the kidney transplant program, and an electrical engineer from northern India brought a "sweat-proof" electronic hand for a shopkeeper being treated in the physical rehabilitation unit. All this happened while the regular staff was planning for an increase in daily outpatient visits from 3,000 to 5,000.

Being a chaplain in the midst of all this affirms my conviction that what we do *does* make a difference. Ida Scudder's motto has echoed around the world: "Not to be ministered unto, but to minister."

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# Experiences at the Interface Between Psychiatry and Religion

Irving M. Rosen, MD

***I believe that the ability to recognize religious and spiritual issues can add much to our current offerings of psychological and pharmacological modalities.***

My parents were both rebels against orthodox backgrounds and transmitted to me, if anything, a negative view of religion. Yet, I am now director of a clinic in religion and psychiatry, have taught at seminaries, have been on committees for religion and psychiatry including that of the American Psychiatric Association and have written many papers in the combined fields. This despite the fact that I was trained during the period dominated by the thought of Freud who had reduced religion to wish-fulfillment, father-longing and search for consolation. His influence, to this day, has thrown a pall over psychiatry's interest in the field. What happened to me?

**Boston: 1950-1955**

As luck would have it, when young clergy flocked to Boston State Hospital in the early 1950s to learn about the new "religion" of Freud I was the resident assigned to teach them. I was uncomfortable at their eagerness to give up their own identities to jump on the new bandwagon because I had already realized that psychoanalysis, however valuable, was not going to be adequate to understand and treat our difficult patients. Psychiatry was new then, whereas the religious establishments had dealt with psychiatrically ill people for hundreds of years. What insights could we learn from their experience and literature? They had dealt with depression and scrupulosity and had methods for combating anxiety, bitterness, guilt, grief, despair and suffering. They were strong where we were weak. They had information on how to inspire and motivate and convert and sometimes to heal. They pointed to aspects of psychology we were neglecting: courage, humility, altruism, ritual, ecstasy, will, prayer and worship. While the young clergy read our books, I read theirs. Around 1954 I arranged for a long lecture series at Boston State Hospital on aspects of religion relevant to psychiatry given by professors from the many religious schools in the Boston area. I found there was much more to religion than Freud had indicated, that there was a reality that could not be dismissed and would not disappear no matter how rational and mature we became.

**Philadelphia and Cleveland: 1955-1980**

In the mid-1950s I was appointed clinical director of the large Philadelphia State Hospital. Among the 6,700 patients there were hundreds who were religious as well as psychotic. There were even a few who were considered psychotic because they were highly religious; they talked about following the will of God or they spent much time praying and reading the Bible. Religion was suspect in those days.

The chaplains and I set up a weekly inter-disciplinary seminar to study patients in order to tease apart religious expression and behavior from psychopathology in chronic patients.[1] I continued such seminars but with acute patients[2] after I moved to the Cleveland Psychiatric Institute. It was instructive to observe that many patients, adhering to the authority of the Bible or the Church had a different basis of thinking from that of the scientifically trained professionals. To the latter, these patients appeared irrational, superstitious, overly concrete, and to some, insane. Failures in communication were inevitable.

While religious symbols such as God vs the devil or punitive authority images contributed to anxiety in some patients, in others their religion served an indispensable function. Religious beliefs and a religious community were of great help to some who had been grossly neglected in childhood. Others borrowed identity from religious heroes. There was another group of patients from whom religious practices such as prayer and Bible-reading served to defend against hostile acting-out and to provide equanimity amidst the irritations of life on the back wards. We had the opportunity to evaluate patients who became acutely psychotic at services by a local evangelist who dramatized his preaching by having the "blood of Jesus" drip from the ceiling. (It was later found to be chicken blood.)

We could distinguish in one woman a combination of a conversion experience plus psychosis. When the psychosis was alleviated her conversion remained as she continued to

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be religious and anxious to correct her faults. She had insight into a previous build-up of anger over an injustice that had culminated in the episode. I think the power of the conversion experience triggered a transient psychosis.

Many religious experiences did not lead to changes in moral character. They appeared to be end results of a combination of hostility and a wish. An example of this was the case of a 47-year-old Catholic man under severe financial pressure whose anger boiled over because of what he felt to be an unjust debt. He suddenly felt he possessed special powers and had a strong urge to begin a Lourdes clinic where people would be fair and decent. This mechanism apparently uses a religious symbol to channel anger.

In one case religion unfortunately did nothing to divert hostility but gave it a rationale. This was a 29-year-old divorced woman who reported little religious interest prior to her current situation. She had been divorced from her husband the previous year but her desire for revenge continued. As she was driving, a feeling came over her that she had to do the will of God; then God "told" her to hit another car, and she did, killing a pregnant woman driving in another lane. Such cases, though more often reported, are, I believe, much less common than those in which hostility is successfully warded off by the patient's defenses, not the least of which are religious defenses.

In our seminars the chaplains and I spent 1 year interviewing patients who were avowedly not religious.[3] We wanted to determine whether we could find some sort of religion in such patients. Lacking beliefs in some socially held sacred system or church membership, did they have another center for their beliefs and attitudes? Finding answers required a religious and spiritual status examination. We saw 50 such cases. Our initial interviewee was a 30-year-old man who complained of headaches relieved by masturbating and gambling – a surly individual forced by his pain to seek medical help. We first asked him how he valued his own behavior. He knew it was not constructive, but it kept him "from more criminal activities." He said that this type of interview made him think about himself and got closer to his core than the usual mental status questioning. These so-called unreligious patients did have some sort of center, some revered object, often the mother they remembered from childhood with little further development of worship-worthy objects. There were a variety of other most highly valued objects: health, family, even guns, cars or drink. One man, well educated, worshipped human reason. "Since at crucial times I would go blank, I lost faith in that faculty; I did not know where to seek hope." An interesting group were those who had rebelled or had become alienated from their church. Reconciliation was crucial for them.

***Psychiatry was new then, whereas the religious establishments had dealt with psychiatrically ill people for hundreds of years.***

Occasionally I was asked, "What do you mean by religion?" At first my glib answer was that religion is that subject found in a large theological library. Yet I did wonder whether it was a necessary part of the human organism or, as Freud had indicated, was expendable and to be outgrown. I studied the writings of instinct psychologists and ethologists and found no specific instinct. Nevertheless I doubt that any primitive society has been found without a fairly extensive religious system. I concluded that since human instincts are few and do not rigidly program our lives, *we have religion instead of a specific instinct system.* Ultimately it is a guide to choice. Primitive religions have taboo, tradition, and manna – what not to do, what to do, and the power to effect choice. There are important implications in this line of thought. Religion is not optional. Those who have thrown out their religious heritage seem to have religion come in the back door. Communists end up worshipping the state. Freud ends up worshipping man and reason, which tend to be frail reeds. If Freud said that religion is an illusion, further thought indicated the exact opposite – that religion is man acting as the inclusive scientist searching for what is most real and lastingly valuable. Moses, Jesus, and St. Anthony were not weak people seeking consolation. To make and implement good choices two ingredients are necessary. Knowledge – the best possible from all sources – is needed. Thus there is theoretically no conflict between secular science and religion. The second ingredient is health, and this has been prominent in religious writings from the beginning.

In the 1960s my interest shifted to meditation after I attended a workshop by Philip Kapleau, author of the classic *The Three Pillars of Zen.*[4] I experienced the power of Zen meditation to quiet and control the mind. At a conference in the early 1970s I experienced Rajneesh's so-called chaotic meditation,[5] a series of alternating active and quiet approaches. This method had the power, I found, to quiet agitation or to create a high state depending on one's mood. There was more to meditation than I had realized. I then spent a week at a camp run by the Sufis, originally the mystic arm of the Moslem religion although the American Sufis had broken away from the parent religion. There I experienced the effects of guided meditation and various active methods including the famous Sufi dances and whirling.

Meditational psychology, I learned, is a rich field adding many insights and powers to Western psychology. Meditation works on the form and process of our thinking, not on content such as conflicts, fantasies and relationships. We use drugs to help us with the process of relaxing, sleeping or slowing our minds. It is true that drugs can work when meditation cannot. Meditation, however, has fewer side effects than drugs, stimulates growth and strength and lets us listen to ourselves. I learned that while all meditational approaches have the same

goal, the particular method used may induce calm or stimulation.

The benefits of meditation are many: changing the locus of control from outside to inside, learning to let go, preventing over-attribution or over-thinking, limiting judging and comparing, enhancing self-control and objectivity, working against static thinking, to list only a few. I noted that these benefits seemed to fit the needs of our patients, many of whom are other-directed, have poor willpower and concentration, are inflexible and tense, future or past-oriented, trapped in childhood belief systems and myths and unable to let go of negative emotions. They are grim, defensive, insomniac and caught in vicious circles. I thought it was remarkable that a non-thinking modality could offer so many cognitive insights. It became clear to me that popular conceptions of meditation were wrong. It is not occult, narcissistic, escapist, anti-intellectual, spacy or fuzzy. It is a major route to spiritual development.

Along with meditation the subjects of stress, life-style and the whole person emerged into popular awareness during the 1970s. Carl Simonton[6] popularized a wholistic approach along with imagery for the treatment of cancer. I became part of an organizing group in Cleveland for an agency to promote this humanistic addition to therapy for cancer and other chronic diseases. This "Cancer Project" continues to this day as the Institute for Personal Health Skills and there are many such agencies throughout the country.

**Providence: 1980-present**

In 1980 the director of the Cancer Project, Dorothy Sawyer, asked me to give a lecture on spirituality. I objected, saying I had no idea what spirituality meant. Not one to take "no" for an answer, she suggested that I just put together what I had presented in workshops about wholistic, existential and meditational psychology, and this would comprise spirituality. After much reading I concluded she was right but found that defining it in an understandable and useful way was a daunting task. Actually spirituality cannot be defined adequately because it contains disparate elements. Most of the definitions I saw used words like meaning, God, ultimate power and transcendence, which themselves need definition.

***If Freud said that religion is an illusion, further thought indicated the exact opposite – that religion is man acting as the inclusive scientist searching for what is most real and lastingly valuable.***

I came to believe that spirituality is a domain, a level of development of the mature and responsible person. The whole person is one who is growing, resilient, balanced and purposeful with constructive attitudes; also one who can find meaning, come through suffering, commit to trust and love and deal effectively with stress and the stress emotions of anxiety, anger, guilt, shame and grief. From this matrix there emerges the "Witnessing Self" able to apply the powers of meditation and finally to reach a sense of compassion and unity with the universe, the ultimate goal of meditation. We can help our patients by seeing and affirming these issues or helping the patients to grow in them. The cognitive aspect of spirituality[7] is accessible to our understanding and use. There is also an energy aspect, the "Spirit" or spark of life that can be felt, but I think we need to learn more about it if it is to be controlled and used in helping.

Over the years, despite lukewarm interest in religion and wonderment at my interest, administrators and colleagues have tolerated my activities. In fact, for several years, I led patients in groups for discussion of spiritual issues at the urging of the clinical director at Butler Hospital. When I discussed retirement in 1988 the administration preferred that I stay and direct a clinic for religion and psychiatry in addition to my general staff work.

More than ever I believe that the ability to recognize religious and spiritual issues can add much to our current offerings of psychosocial and pharmacological modalities. But the field remains neglected by medical and psychiatric professionals with the exception of those specializing in addiction who have found value in the spiritual ideas of AA. At the American Psychiatric Association conventions we are often reprimanded for our neglect, most recently by Hans Kung and M. Scott Peck, but so far not much has resulted. Government funding agencies hesitate to breach the wall of separation between the state and religion. Also scientific research is difficult to design. Further, as in earlier days of medicine, it is difficult to distinguish quackery from truth. Full recognition of religion and spirituality as scientifically and clinically respectable subjects remains a challenge for the future. Perhaps some little progress has been made.

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# Medicine and Ethics at the Crossroad: A Roman Catholic Perspective

The Rev Robert J. McManus, STD

***While the expert exercise of medicine is a scientific practice, the art of moral reasoning depends heavily upon the intelligent and critical exercise of the virtue of prudence.***

Every Catholic priest will attest that there are times when religion and medicine meet in the life of one of his parishioners. When this happens, the priest is often called upon to play a significant role as a moral teacher and spiritual guide in this drama. Yet, if he hopes to exercise these roles responsibly and to provide morally appropriate pastoral guidance, the priest must understand, to the best of his ability, the facts of the medical situation that call for moral evaluation or insight.

Several years ago, I found myself squarely involved in the process of helping people come to a conscientious and morally justifiable decision concerning the withdrawal of the artificial provision of nutrition and hydration from a family member in a persistent vegetative state.

Marcia Gray was a 46-year-old Roman Catholic woman who suffered a massive cerebral hemorrhage that left her in a persistent vegetative state. Immediately upon hospitalization, surgeons operated on Marcia to evacuate the blood clot in her brain. The surgery confirmed that Marcia had incurred, as a result of the hemorrhage, severe brain damage to her right cerebral hemisphere.

Several physicians who examined Marcia all arrived at a similar prognosis: "No hope for recovery." Faced with such a dismal prognosis and claiming to know what his wife's wishes would be in such a medically grim situation, Marcia's husband and family sought to have her feeding tube removed.

As a moral theologian I was asked by the lawyer for the Gray family for ethical advice. The specific inquiry was whether the Gray family would be morally justified, according to the Catholic moral tradition, in requesting and obtaining the withdrawal of the feeding tube.

This clearly was a case where religion and medicine had to enter into dialogue if a morally correct position was to be offered to the perplexed family so as to help them come to a morally defensible decision about continuing or discontinuing artificial feeding.

From the side of religion, I had ready at my disposal the moral and theological principles that pertained to the medical matter under consideration. Drawing on a 400-year-old Catholic moral tradition, contemporary moral theologians, while addressing similar although not identical cases, had developed arguments that clearly supported the decision to forego or withdraw medical treatment under certain medical circumstances. In essence, their argument was that if the medical treatment under consideration was either medically futile or burdensome, causing only the continuation of the patient's physical pain or even psychological fear or repugnance, then it could be evaluated properly as extraordinary or morally disproportionate. In such cases, the medical treatment could be withheld or withdrawn with moral justification.

Another moral principle at the crux of the cases to which I would turn to guide my moral reflection was the principle of double effect. This principle stipulates that the decision to withhold or withdraw medical treatment can be made to achieve the primary effect of relieving the patient of the burden which the medical treatment is causing, even though the secondary effect, the death of the patient, is foreseen. However, it has to be morally certain that the primary intention of the decision-maker is not to cause the death of the debilitated patient but only to relieve the burden caused by the medical treatment.

During formal moral theological training, I had studied the principles and arguments of the Catholic moral tradition. Religion had spoken. What was still needed to make a sound moral evaluation of Marcia Gray's medical predicament, however, was to listen to the voice of medicine.

Several key medical questions needed immediate answers if the dialogue between religion and medicine was to be instructive. First, Mrs. Gray was being fed by a gastrostomy tube. Was this procedure a medical treatment or not? If it was, then as a medical

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***ABBREVIATIONS USED***

***PVS: Permanent vegetative state***

treatment the artificial provision of nutrition and hydration could be subject to the benefit/burden calculus that would help to ascertain whether it was an ordinary or extraordinary means of medical treatment. If it were an ordinary means, it could not be discontinued because the dignity of the human person, no matter how medically debilitated, demands the provision of such means. But if it was an extraordinary means of medical treatment, then there existed the morally defensible option of discontinuing the procedure.

***. . . it has to be morally certain that the primary intention of the decision-maker is not to cause the death of the debilitated patient but only to relieve the burden caused by the medical treatment.***

The moral reasoning that needed to be pursued was dependent upon correct medical information that could not be found in the bio-medical ethical literature of the Catholic theological tradition. I did not need to talk now to another theologian; I needed to converse with an expert medical practitioner.

Another medical question that had to be answered before my moral reflection could proceed was: what was the actual neurological condition of Mrs. Gray? What was the most reliable prognosis? Was the artificial provision of nutrition and hydration a temporary medical intervention that would give the patient sufficient time for her medical condition to be significantly reversed? Or was this medical intervention simply circumventing an underlying fatal pathology and artificially suspending, perhaps for an indefinite period of time, the dying process which Mrs. Gray had actually entered when she suffered the massive cerebral hemorrhage several years previously?

No amount of research through the Catholic moral literature could provide me with the correct answers to these pressing medical questions. I needed to learn the answers from a competent neurologist.

While the expert exercise of medicine is a scientific practice, the art of moral reasoning depends heavily upon the intelligent and critical exercise of the virtue of prudence. Once the medical facts were known, I had to apply the pertinent moral principles to the circumstances of Marcia Gray's medical situation. However, in the process of applying principle to circumstance, the degree of moral certitude necessarily diminishes. For example, while any two moral theologians might readily agree that a person is not morally obligated to use extraordinary means of medical treatment to preserve his or her life, there is no infallible guarantee that the same two moral theologians would agree with the same degree of certitude that the medical treatment under discussion, (ie, the artificial provision of nutrition and hydration to a person in a persistent vegetative state), was morally disproportionate or an extraordinary means of medical treatment and therefore, capable of being discontinued.

I had entered into the dialogue between religion and medicine, hoping to help the Gray family reach a conscientious and morally sound decision about the continuance or discontinuance of Mrs. Gray's medical treatment. I realized that it was the initial inclination of the Gray family to withdraw the artificial provision of nutrition and hydration from Marcia. I presumed that the dialogue between the moral principles of the Catholic theological tradition and the medical facts of this specific case would indicate that the decision to terminate treatment would not contravene Mrs. Gray's moral beliefs as a Catholic. However, what became evident during the unfolding of the Marcia Gray case was that in the dialogue between religion and medicine over the proper course to follow in making an end-of-life decision, some voices of religion were more willing to say "enough medical treatment, no more" than some voices of medicine.

Certainly most of the medical-moral issues that contemporary moral theologians are asked to study are not to be found in the Bible. Nonetheless the entire enterprise of doing Catholic morality is profoundly influenced by certain biblical and theological themes. One such theme is that while human life is a fundamental moral good or value, it is not the supreme moral good or value. Eternal life with God would be the only contender for such superlative status on the moral scale. Therefore, it follows that there can be certain circumstances under which and certain moral values for which a person can sacrifice his or her life without the self-sacrifice constituting the moral malice of suicide. Given this theological premise, a position can be framed that would argue that in the face of certain irreversible medical circumstances that make the initial or continued employment of a particular medical treatment morally disproportionate or extraordinary, the medical treatment can be withheld or withdrawn. In the case of Marcia Gray, after being a prominent partner in the dialogue between religion and medicine, I had reached the moral conclusion that the artificial provision of nutrition and hydration could be discontinued precisely because it was, under her specific medical circumstances, morally disproportionate.

***. . . what became evident during the unfolding of the Marcia Gray case was that in the dialogue between religion and medicine over the proper course to follow in making an end-of-life decision, some voices of religion were more willing to say "Enough medical treatment, no more" than some voices of medicine.***

Certain health care providers in the state of Rhode Island were not of the same mind. Some medical professionals saw the discontinuation of Mrs.

Gray's medical treatment as a type of medical and moral abandonment. Others suggested that not to have begun the artificial provision of nutrition and hydration might have been morally justifiable; but to withdraw it, once begun, was morally indefensible. Indeed, while it was never actually said, I sometimes wondered whether some medical personnel were of the point of view that to withdraw medical treatment from a PVS patient was to admit the limits of medical technology and even of the medical profession itself.

The fact that there was some serious disagreement between the voice of religion and some of the voices of medicine indicates that the dialogue essential to the moral evaluation of Marcia Gray's medical situation has to continue. Religion believes that the ultimate meaning of human life is derived from a source that grounds, yet also transcends, all innerworldly values and goods. Such religious faith properly relativizes the apparent ultimacy of the human condition. Medicine, on the other hand, while not necessarily making any claims to omnipotence, does not always recognize that the horizon of religious faith can sometimes render medicine's most technologically sophisticated efforts unnecessary and sometimes even unwanted.

The dialogue between religion and medicine must continue in a serious and intelligent manner so that at times of complex medical and moral crises, people will receive the moral guidance that is medically sound and the medical treatment that is morally appropriate.

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# My Clergy, My Doctor

Timothy M. Empkie, MD, MPH

***Our separation of church and state, which I fervently support, may have led to an unconscious separation of church and medicine, which I do not believe is in the best interests of the people we serve.***

It was my first week in the small North Dakota prairie town where I was to spend 2 years working as a family doctor sponsored by the National Health Service Corps. There were the usual chores of getting settled in a new apartment, getting the office organized, meeting new people every day. This would be my very first job as a doctor. There was a lot of pressure, perhaps mostly self-induced, but in speaking with people in town their expectations of the new young doctor seemed high. One person hinted that patients might be slow to come initially but told me not to worry because once I performed a miracle or dramatically saved a life they would flock to the office door. I had not remembered that lesson from medical school. Historically I was aware that clergy were the first doctors but I had not anticipated this close modern day relationship. As I sat in my office, my secretary buzzed to say that the owner of the bowling alley had come in for a personal talk. I had stopped at his establishment earlier that day to ask about joining a winter league, but he was not available. An older man, he was dressed completely in black, almost like a priest. He was excited that the new doctor was interested in joining a team and had an assignment for me. His friendly face was open and expressive. He spoke quickly and seemed unduly nervous and deferential, given my youth and inexperience. I was very appreciative, flattered really, that he would make the effort to come and see me. I thanked him for coming. As we finished and rose he said, "Thank you, Father," not noticing his slip. That just added to my anxiety.

Subsequent experiences as a family physician in that small town, and several other locations, urban and rural, big and small, have convinced me that people perceive a significant overlap in the roles of physicians, especially family physicians, and clergy. Although none of us is skilled at making miracles, as my career develops I am increasingly impressed how much the family physician has to offer patients and their families, above and beyond provision of medical care, in functions traditionally identified with clergy. Listening, reflecting, guiding, comforting, asking the right questions more than having the right answers, showing compassion, simply being available in times of stress and need. We both have contact with people at key times in their lives. We each have our rituals for the newborn child, make home visits, see people in hospitals and nursing homes, are present when a death occurs, and attend funerals. We both believe mind affects body and vice versa. We both care about the total person. Despite our mutual concern for the people with whom we work, however, my perception is that family physicians and clergy have little professional contact concerning those whose lives we touch. Several factors might explain this lack of interaction.

Our separation of church and state, which I fervently support, may have led to an unconscious separation of church and medicine, which I do not believe is in the best interests of the people we serve. In our diverse society, where even the most remote prairie town has churches representing half a dozen religious denominations, the family physician may not be knowledgeable about the different religions or may be uncomfortable intruding in the religious life of the patient. Conversely, the physician may be reluctant to discuss religious beliefs with the patient if they differ from his own. It may be safer not to deal with religion at all. In a small southern town, some board members of the community health center where I worked gently inquired about my own church membership. I admitted that I did not consider myself a member of a particular church. They wanted to know what church I attended. None regularly, I tried to say with respect as we stood there on the lawn of the largest church in town. The form of the next question was hypothetical, what church would I attend? Struggling somewhat, I said that over the years I had attended several churches. Finally, the last probe of this friendly inquiry, to what church

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***ABBREVIATIONS USED***

***AIDS: Acquired immune deficiency syndrome***

did my parents belong? The Episcopal church, I said, and that was all that was needed. It became clear that they wanted to have a point of reference in thinking about me and working with me. The specific nature of my beliefs was not as important as a sense that I might have some, or at least that I might try to be understanding of theirs. My concerns were unfounded.

Regardless of a physician's level of comfort dealing with them, religious issues regularly come up with some patients. Recently, a previously healthy patient, whom I know well and admire, was wrestling with a decision about whether to receive chemotherapy for newly diagnosed cancer. She was clearly reluctant to take this step because she felt well and had seen friends and family members with similar illnesses suffer with long courses of treatment. I wanted her to give chemotherapy a try, but she was not convinced by my medical argument. "I have faith, Doctor." She paused. "Do you have faith?" I believe I understood what she meant but I could not say to her that God would take care of her, or that God must have His reasons to call her at this time, or that God works in mysterious ways, because from my own upbringing I do not know that to be the case. What I could do was to recognize the importance of this woman's religion and be supportive, providing hope where I could. Although I discussed this with her and her family, I would have liked the opportunity, at that moment, to discuss it with a member of the clergy from her church especially because this was the real interface between religion and medicine. Would such a discussion with clergy violate my confidential relationship with my patient? Would it violate her relationship with the clergy? A working relationship with clergy would be helpful at such times.

Because there is limited contact between physicians and clergy in the hospital, and almost none in the outpatient setting, such relationships seem infrequent. During my medical career, I have worked and trained in hospitals affiliated with a variety of religions, including Jewish, Catholic, several different Protestant denominations, and non-sectarian community hospitals. My experience is probably typical of many physicians. In each hospital I have had some contact with clergy but relatively little considering our physical proximity and shared interests. The hospital-based clergy, often itinerant clergy-in-training, did not really know the patients as individuals (and certainly not their families) any better than I did as an itinerant doctor-in-training. The community clergy who did know the patients made their rounds independently from the physicians, and there was little communication between the professionals. This seemed to be true no matter what the affiliation of the hospital. The most noticeable exception to this was in small communities where interaction between clergy and physicians occurred at several different levels. We played softball together, we served on committees together, and we met at social gatherings. We came to know each other. Despite the contact, however, our communication regarding specific patients in the professional setting was rarely initiated by either the clergy or the physicians.

***Rarely in my medical training was emphasis placed on the value of communication with clergy to aid in the care of patients.***

For patients being seen in the outpatient setting my sense is that there is virtually no contact between physicians and clergy. Two healthy elderly people that I see are becoming increasingly anxious about the inevitable loss of independence that they face as they get older, especially since their grown children do not live in this area. This directly affects their sense of physical well-being. I met together with them and a daughter to facilitate this communication between generations. One of my suggestions was that the couple discuss their concerns with the new pastor at their church. I was sure he could be helpful in identifying church-supported services that would allow them to remain relatively independent for as long as possible. I was eager to discuss this with the pastor as well but decided this would be too intrusive, both in the lives of my patient and in the work of the pastor. Although I feel this was a legitimate activity for me as a family physician, I remain somewhat reluctant to make this contact. Rarely in my medical training was emphasis placed on the value of communication with clergy to aid in the care of patients. Similarly, it seems that it was not stressed in the education of clergy.

Trying to look at this from the perspective of the clergy, I can imagine a perception that the average physician does not have the real interest, let alone the time or comfort level, to discuss patient issues with them. Given our present tendency to think of health and disease primarily as a medical rather than a social or spiritual phenomenon, I can understand this conclusion. A physician who has been in a community for some time and is a member of a congregation may have a good professional as well as personal relationship with the clergy of his church or synagogue, but may have little contact with clergy of other denominations. Because religion is an enormously personal issue, clergy may be reluctant to engage in dialogue with physicians whose religious beliefs are unknown to them. To the extent that there may be differences between different kinds of physicians (primary care physicians in comparison with specialists, for example) regarding their inclination to address the spiritual needs of patients, clergy may not perceive such differences. As a result they may be reluctant to approach even those physicians who might welcome their interest. And just as some physicians are reluctant to become involved in spiritual issues, some clergy may believe their role does not extend to discussion of medical issues with physicians.

If family physicians and clergy have common interests in caring for people, and have demonstrated reluctance to work together based mostly on misun-

derstanding of one another's functions, several actions could be taken to improve this situation. Clearly, both professions would benefit from better knowledge about the other. This could be accomplished at the level of professional training, as part of continuing education programs, through increased interaction between professional societies, and through regular contact between professionals as part of seminars and panel discussions around issues of clear concern to both professions.

***Imagine a seminary class co-led by a family physician and a clergy person discussing how both can work together to help people.***

At the training level, the opportunities for collaboration are substantial. At the Brown University School of Medicine, the 8-year Program in Liberal Medical Education could offer both professions a chance to take their common message to future doctors as early as their freshman year in college. At the residency level where graduates of medical schools complete their clinical training the presence of a visible dialogue between physicians and clergy could help guide future physicians in their work with clergy. Presumably, similar opportunities could exist for physicians to be an important presence in the process of religious training. Imagine a seminary class co-led by a family physician and a clergy person discussing how both can work together to help people. Even better, imagine seminarians and family practice residents meeting together to exchange notes on the anxieties they confront as they learn to work with the sick. Pharmacology doctoral students benefit from hospital patient rounds with family practice residents and add to the learning of young doctors. A similar opportunity could be designed for seminary students of religious studies. Seminarians could accompany physicians on home visits to share another perspective of people's lives, comparing their approaches with those of the doctors'.

Following training we could do better at maintaining an open discussion between practitioners in medicine and the clergy. Medical societies could invite clergy on a regular basis to present topics of mutual concern. Clergy could be invited to participate in monthly society meetings as informal or guest members. Physicians could be invited to speak to religious groups. Continuing education meetings for both professions could include sections dealing with issues of interprofessional relationships and problems. Interdenominational panel discussions including lay participants would be helpful to both professions in tackling the respective roles of each regarding specific issues such as suicide, depression, death of family members, dealing with a chronic illness or disability, and, of course, accepting one's own dying process and death. The crisis of AIDS, for example, presents a striking challenge to clergy and physicians to maximize their impact through cooperation and understanding.

Unfortunately, many of us are not able to live in small communities where interdisciplinary cooperation is facilitated by physical proximity and close personal knowledge of colleagues in other professions. Relationships develop in small towns without planning that in urban areas require considerable thought and effort. Even in rural areas, however, collaboration must be an active process. Physicians and members of the clergy share interests in providing assistance to people throughout their lives. The roles are not identical but the overlap is considerable and crucial to many people. Collaboration between these helping professions can be rewarding for us as well as for those we serve. In Rhode Island, whose remarkable legacy of religious tolerance is an example for all, let us recognize that we have much to gain. Our society will be better off for our efforts.

**Acknowledgment**

My thanks to Tina Kenyon and Ann Ronan for reviewing this manuscript.

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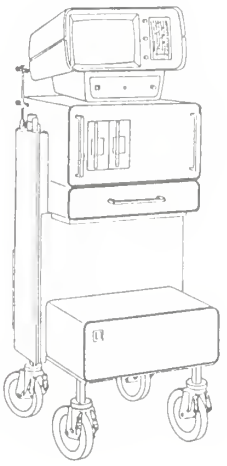

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# We Are the Elderly

Rabbi James B. Rosenberg

***[T]here is no greater measure of our worth as a community than the way we treat our elderly.***

If you are reading these words, you are old . . . or in the process of becoming old. No exceptions. We are all either already elderly or waiting to become elderly. Only death can stop the march of years. Given the alternative, most of us come to accept the inevitability of our aging with some measure of grace.

In June 1991 my wife and I went to New York City to attend my 25th college reunion. Each of us from the Columbia College, class of 1966, wore a name tag that included his graduation picture. In many cases it was impossible to see any connection between the young fellow pictured on the name tag and the rather corpulent, gray or bald middle-aged man on whom the name tag was pinned. Time happens.

All living things age. It's nature's way. What's new these days is that so many of us are living to a ripe or not so ripe old age. The exploding number of elderly citizens has contributed to a national health care crisis. Here in Rhode Island the crisis is particularly acute, for we are one of the nation's "oldest" states, and we're aging at a rapid pace. Rhode Island had the third highest proportion of people over 65 years of age in the nation and had the highest percentage of people over 85 years of age. By the year 2000 Rhode Island's old-old, the 75 and older group, is expected to increase by 32%. In contrast, the state's young adult population (25 to 34 years old) will drop from about 180,000 to 138,000, a 31% decrease. Obviously, as our population continues to grow older, many more of us will confront the diseases and vulnerabilities of old age. For example, 20,000 Rhode Islanders over 65 are diagnosed as having Alzheimer's Disease or some related form of dementia. Nearly half of all Rhode Islanders who turned 65 in 1990 will spend time in a nursing home at some point during their remaining years.

Many readers are probably familiar with the report of Aging 2000, which came out in December 1991. Aging 2000, you will remember, was in its original incarnation, a think-tank set up by Ira Magaziner to address a number of the problems relating to Rhode Island's aging population. The Aging 2000 report, subtitled Directions for Elder Care in Rhode Island, is crammed with all sorts of facts, figures, anecdotal material, and policy recommendations. It focuses on such complex, interrelated issues as the quality of health care, the bureaucratic paperchase, spiraling costs, the technical dilemmas arising from medical decision-making, housing for the elderly, medications for the elderly, lack of education about the aging process. While the problems are daunting, the report is not an altogether gloomy one. Aging 2000 does come up with several specific recommendations for improving the way we Rhode Islanders deliver health care to our elderly. Some of these recommendations are already being translated into action.

While it is certainly important for us to keep in mind these broad social, political, and economic issues when working with the elderly, it is imperative never to forget the human dimension. The old man and the old woman are you and I down the road, if we are not there already. Such perspective leads inevitably to the question: How does the undeniable fact that we are growing older affect us, our families, and our relationship to the elderly with whom we offer our professional care?

One need not be a philosophical genius to understand that we view time differently as we move through the years. When we are young, we feel that our future is infinite, that we will live forever. As we settle into our middle years, our personalities are nourished by the experience of things past and by our hopes and plans for what is yet to come. When we are old, our lives have been mostly lived; our present is shaped primarily by our past, for the prospects of our biological future are – shall we say? – limited.

No matter where we happen to find ourselves in the life cycle, however, one fact remains unchanged. We need to feel needed. We need to feel that we matter. We need to feel that we count. We need to feel that our lives make a difference to others. This fundamental principle has guided my relationship with the elderly in our midst. For several years I have been visiting my congregants' mothers and fathers who are living in nursing homes here in Rhode Island. I try to spend at least an

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hour or two every week visiting the elderly, so that on average I visit a nursing home resident about every 3 weeks. I make these regular visits because I believe it is important to my congregants' parents, it is important to my congregants, but, most of all, it is important to me.

Let me share with you two experiences. The first concerns a woman at the Jewish Home for the Aged whom I visited regularly for several years until she died. To protect her anonymity I will call her Sarah. Sarah loved to complain. From November to April she would tell me that she was too cold; from April to November she would tell me she was too hot. Sarah used a walker. When she felt up to it, I would take her and her walker across the hall to the elevator; when we would reach the first floor, we would go over to the little gift shop, where I would buy her some candy, always the same thing; two Hershey bars, dark chocolate with nuts, and two packages of Life-Savers, multi-fruit flavored. I don't think Sarah ever thanked me for one of the dozens of bars of chocolate or packages of Life-Savers I bought her over the years; she felt the candy was her due. However, if I ever showed up without the loot, she would insist that I go downstairs and get it for her; for she was usually too tired to go with me. It was our little game.

One day I was feeling particularly harried, and Sarah decided to put me to the test. We got off the elevator, and it took her 13 minutes to cross the hall to her room. With every shuffle of the walker, Sarah delivered a lengthy dissertation as to precisely what hurt her. By the time I left Sarah's room, I found myself angrily asking why I bothered to visit someone who was so unappreciative. I received my answer at my next visit. I was unable to see Sarah for 4 weeks, because I was sick during the week of my regularly scheduled visit. When I walked into her room a week later than usual, Sarah smiled and said: "I missed you last week. I'm glad to see you."

The second experience concerns a man I shall call Sam. Sam suffered from Alzheimer's Disease. When I first began to visit him, he still had some language function, but over the years he lost the ability to make any sounds at all. One day, shortly before Rosh Hashanah, the Jewish New Year, I walked over to Sam who was strapped in his wheel chair and grabbed hold of his wrist in order to establish some human contact. Though Sam hadn't uttered a sound to me in many months, I nevertheless said: "Sam, I want to say hello and to wish you a happy New Year. The Jewish New Year is coming. At that Sam opened his mouth and said with great clarity, "Rosh Hashanah!" Those were the last sounds I ever heard Sam make.

I tell you about Sarah and about Sam because I am convinced that visiting the elderly matters. It matters to the elderly. It matters to their families, but most of all it matters to the person making the visits. It is no rhetorical flourish when I state quite simply that

I have received far more from the elderly I have visited than I have given.

If you should happen to walk in to the Jewish Home for the Aged, you will find large Hebrew letters inscribed on the wall to your right. These words, a plural form of a verse from Psalm 71, translate to:

*Do not cast us off when we are old; when our own strength fails us, do not abandon us.*

While I have a great deal of respect for the Jewish Home as an institution, I would suggest that this is precisely the wrong message to give visitors or residents. The verse from Psalms is negative, demeaning and appeals to the sense of Jewish guilt. Our elderly are not castoffs, like last year's running shoes. We do not need to be told when we walk into the Jewish Home or any other nursing home that we shouldn't be mean to people who are weaker than we are. Rather, we should remember that the Judeo-Christian tradition honors the old, that we have much to learn from the elderly, that it is a great and kind deed to visit and care for the aged. Indeed, there is no greater measure of our worth as a community than the way we treat our elderly. Therefore, I would suggest that the words from Psalm 71 on the wall of the Jewish Home for the Aged be replaced with words taken from the Holiness Code of Leviticus, chapter 19, words that spell out the obligation of every Rhode Islander, regardless of religious background:

*You should rise in the presence of the elderly and crown the aged with honor!*

***Nearly half of all Rhode Islanders who turned 65 in 1990 will spend time in a nursing home at some point during their remaining years.***

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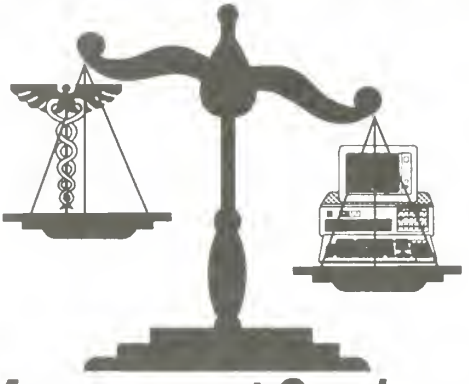

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# The Commonalities of Religion and Medicine

Louise S. Kiessling, MD

***One need not believe in miracles to appreciate the strength of the human spirit.***

Talking about religion makes me uncomfortable, as I suspect it does many of my colleagues. Am I being asked to admit to my own lapses in religious belief? How do I feel about medicine and religion? Are they separate fields of human inquiry without commonality, or do they share important elements? They certainly both deal with the human condition! Religion can "heal" a drug addict better than medicine, and successful medical treatments for addiction use the techniques of religion: confession, forgiveness, support, rebirth, missionary zeal.

Physicians often have trouble thinking about religion because they believe they are scientists, and scientists either suspend belief or are nonbelievers. While a medical student, the physician is trained to think logically, to use scientific reasoning, and to treat patients from a factual knowledge base that emphasizes doing something for or to the patient, but not so often along with the patient. There is a strong tendency for physicians to be skeptics, to question, not to accept dogma. These latter attributes tend to be antagonistic to religion, where faith and unquestioning acceptance of dogma are important elements of the organized religious experience.

Sometimes, I think we physicians forget the art of healing and overemphasize the science of medicine. The border between medicine and religion gets blurred when one looks at the art because that is where faith enters the picture. Faith is a many-sided virtue. We think of religious people as having faith in God. Physicians, on the other hand, have faith in surgery or medication or their own judgment. This can lead to hubris if one doesn't retain a healthy sense of how little we actually know.

"The power of positive thinking" was the credo of a popular Protestant preacher of 30 or 40 years ago who often reported on the effect of that positive thinking on medical problems. More recently, Norman Cousins pointed out the value of laughter as potent medicine to those with serious illnesses. These commentators are reminding us of the intangibles that make up some of the art of medicine. One need not believe in miracles to appreciate the strength of the human spirit. A recent study reported that the elderly who said their problems were "due to old age" were more likely to be dead at follow-up than equally elderly people who blamed their problems on arthritis or bursitis or some other specific cause. The authors interpreted their findings as evidence that the first group had given up and were not seeking treatment for what might be treatable problems. The elderly were falling prey to the "self-fulfilling prophecy." Physicians need to be wary of doing the same.

There are noteworthy examples of physicians who have also been active religiously. Albert Schweitzer comes to mind, but his vision and mission have been called into question recently as being merely an extension of European colonialism, not truly humane or based on concepts of equality. Actually, Schweitzer came to medicine from religion, first studying theology. Interestingly, he saw medicine as the practical way to express his decision to devote himself "to the direct service of humanity." This, he interpreted to be Christ's message from the parable "Whosoever would save his life shall lose it, and whosoever shall lose his life for My sake and the Gospel shall save it."[1] At the base of Schweitzer's religion were his early efforts as a theologian trying to reconcile science and religion. He came to the conclusion that the primary message of Christ was that of the Sermon on the Mount, exhorting mankind "to judge the value of piety by what it makes of a man from an ethical point of view."[1]

The concept of an ethical faith led Schweitzer to his concept of "reverence for life," which he extended to all living beings. This latter concept is very much in keeping with current thinking about vegetarianism and animal rights. While "reverence for life" is also an element in the Hippocratic oath, it can be expanded into a philosophy, an ideal where the healing art of medicine can be expressed.

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Religion and medicine don't usually blend as completely as they did in Schweitzer's life and philosophy, but they certainly do have broad overlapping concerns about humanity – how men live their lives, relate to each other, and how they die. The current discussion of euthanasia spurred by the actions of a Michigan physician as well as by other groups, provides clear evidence of the commonality of the interests of medicine and religion. The Hippocratic Oath specifically inveighs against aiding suicide. Murder is proscribed by all the major religions as is "self-murder." It would seem that medicine and religion are in total agreement here. Yet, you will hear many people supporting the actions of the Michigan physician.

***. . . successful medical treatments for addictions use the techniques of religion: confession, forgiveness, support, rebirth, missionary zeal.***

"What is wrong with helping terminally ill persons end their pain?" a friend asks. Maybe nothing, but who decides who is terminally ill? Is it the ill person? What is intolerable pain? Have the patients truly had optimal treatment, or are they depressed and inadequately treated? Would they change their minds if given another day? At dinner recently, these questions came up. As we talked, our friends remembered an experience they had had many years ago. A couple had been at their house for dinner and the husband left early to return home. Something made this couple and their hosts worry, so they followed him home a while later. They found him drowsy next to a bottle of pills and an empty alcohol bottle. They got him up and walking, called an ambulance, and arranged to have him treated. He lived another 20 productive years.

George Klein, well known cell biologist, cancer researcher, holocaust survivor, and essayist comments in his recent group of essays, *Pieta,*[2] that most of the physicians who carried out the holocaust were quite ordinary individuals. They could rationalize some of their actions " . . . behind a facade of altruism: hospital rooms could be emptied thus reducing costs of medical care. The program to extinguish *lebensunwertes Leben* (lives not worthy to be lived), as in the case of the execution of chronically ill patients or mentally retarded infants, could be disguised as a humanitarian activity."[2] How do we decide?

As a field of human inquiry, medicine is at its strongest when dealing with biochemical and physical information, and at its weakest when incorporating this information into a treatment program of the total individual. It is only recently that medical school curricula have been consciously teaching physicians the humanities. The study of ethics has gradually crept back into the curriculum. The Hippocratic Oath is a major ethical statement but also a reflection of the cultural mores of the time. In a sense, modern medicine is part of the cultural mores of our time where the "scientific method" is the underlying philosophy of at least a portion of the population. As we have become better able to treat illness physically, we have moved away from the time when the bedside physician more clearly recognized an alliance with religion. A hundred years ago, when the physician had a very limited armamentarium and could often only make the patient comfortable, he was also more likely to spend time sitting with the patient and family at the bedside.

Religion has always emphasized coping – dealing with pain and suffering, finding ways to support people and to help them deal with their own frailties and those of their loved ones. It is only recently that medicine has begun actively incorporating these concepts into treatment. Modern therapy for a patient with chronic pain uses many of the concepts previously felt to be in the "religious" field. We've come full circle in some elements of behavioral medicine, incorporating the "moral" precepts that guided the founders of our first modern psychiatric hospitals, such as McLean and Butler.

Religion and medicine are clearly entwined. Medical practitioners have much to learn from the religious person. Communication with organized religion is imperative if we are to answer many of the social ills of today. On some issues, rebuilding the family, promoting ethics in all ways of life, there may be much opportunity to work together. On some others, such as abortion and the rights of the individual, there may be widely differing views, but we need to support each other where we can. Whether the individual physician is a member of an organized religious group, a believer or not, he or she must have a set of ethical principles. It might well be a philosophy, something akin to Schweitzer's concept of the Sermon on the Mount as the basis of Christ's message. Otherwise, we run the risk of becoming like those German doctors who lived very well as officers of the holocaust and were obviously more concerned with their own lives and well-being than with their patients'.

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## Was Lizzie Borden the Victim of Incest?

M. Eileen McNamara, MD

***[T]he injuries speak of a deep and personal hatred in the attack, as if the assailant wished to obliterate the very identities of the victims.***

The Borden murders a century ago remain unsolved mysteries. On August 4, 1892, Andrew Borden, 69, and his second wife Abby, 64, were found murdered in their home in Fall River, Massachusetts. Both were killed by multiple ax blows to the head. Forensic evidence suggested that Mrs Borden was killed first, the murderer then waiting an hour or more for Mr Borden to come home and meet his death. In the house were their daughter Lizzie Borden, 32, and the Irish maid Bridget Sullivan, 26. Away on vacation in Fairhaven, Massachusetts was the older sister Emma, 42. A house guest, John Vinnicum Morse, brother of Andrew's first deceased wife Sarah, was also away. Their youngest daughter Lizzie was accused of the crime but later, in a trial that brought worldwide attention, was acquitted.

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In retrospect, most scholars believe that Lizzie was guilty. She was alone in the house at the time of the murders, while the Irish maid Bridget was outside washing the windows. Moreover, crucial evidence such as Lizzie's attempt to buy poison the day prior to the murders, and her confused and contradictory inquest testimony, was excluded at the trial and never heard by the jurors.

If Lizzie committed the murders, the motives proposed for the crime, however, have been somewhat unsatisfactory.

Murder for money has been the most commonly suggested motive. Mr. Borden was one of the richest men in town but was noted for his parsimony, making his family live in a small and crowded house in a decidedly "second-class" neighborhood. On the board of directors of several banks, he was peddling eggs from his farm on the street the morning he died.

It has been suggested that Lizzie was jealous of her stepmother and feared Andrew would give his money to Abby and her family. On the other hand, Andrew seemed to favor Lizzie, and despite his stinginess he bought her fine clothes, a sealskin cape, and gave her a grand tour of Europe. She appears to have been able to get what she wanted from him by words alone. Moreover, murder for money could not account for the intense savagery of the murders. Both Mr and Mrs Borden died from multiple ax blows directly to the head, Andrew with 10 and Abby with 19. Andrew Borden's face was nearly destroyed. The number and direction of the blows were far more than were necessary to kill; almost each was a fatal wound in itself. Rather, the injuries speak of a deep and personal hatred in the attack, as if the assailant wished to obliterate the very identities of the victims. If Lizzie was the murderess, there should be more to know about her than what previously has been known. Something other than her petty spitefulness and desire for fine clothes is required to explain the murders.

As a starting point, it is useful to reexamine what we do know about the character of Lizzie Borden. Even from her defenders, there were repeated suggestions that she was withdrawn and socially maladroit. She was described by her friends as very sensitive as a child, inclined to be non-communicative with new acquaintances.[1] The *Boston Herald*, in an otherwise very favorable article about her, noted, "She thought people were not favorably disposed toward her and that she made a poor impression. This conducted to the acceptance of this very opinion

among church people, and consequently the young woman was to some extent avoided by the young women of the church." She was thought to have had an "obnoxiously retiring manner" until about 5 years before the murders.[2] Her uncle, Morse, described her as a "peculiar girl, often given to fits of sullenness." Lizzie was noted to avoid the company of men. She never married, although she was the daughter of the richest man in town. Her former teacher, Horace Benson, said she was "subject to varying moods, and never fond of her stepmother."[1] Moreover, while Lizzie's defenders pointed to her charity work as evidence of her good character, it should be remembered that committee work and charity can be evidence simply of *noblesse oblige* and does not require a psychologically mature character able to form empathic and close relationships with peers.

We also know that Lizzie Borden was a kleptomaniac. After the murders, as a wealthy woman, she stole porcelain plates from Tilden-Thurber of Providence.[3] Florence Brigham, daughter-in-law of Mary Brigham who spoke as a character witness for Lizzie, says that Lizzie was well known as a shoplifter in Fall River before the murders. Stores such as McWhirr's Dry Goods, Gifford's Jewelry Store, and Cherry & Webb's, knew to watch her and send the bills to her father.[4]

Finally, we know that Lizzie lived in a house locked tight against the world. The house had a brooding, morbid secrecy with multiple locks. The outside door was triple-locked, and all the interior doors had locks as well. Inside, there was mistrust, tension, and secrecy. The daughters battled with the elder Bordens, taking their meals at separate times. During the chaos at the time of the discovery of Andrew's murder, when a policeman asked "Where is your mother?", Lizzie had the presence of mind to coolly remind him that Abby was her stepmother, not her mother.

To summarize what we know about Lizzie Borden: she was shy and socially maladroit from childhood, she avoided the company of men and never married, she was a kleptomaniac, and she lived in a tense house with multiple locks and barriers. How could these facts about her be integrated?

Incest. Incest fits these findings very well, as all these characteristics are found in incest survivors. The crime of incest is a profound violation involving not only sexual abuse, but abuse of power, abuse of a child's trust, violation of a child's individualization, and an abrogation of the duties of both father and mother. Boundaries are blurred as the child, in effect, assumes part of the role of the wife, often with the mother's tacit if unconscious consent. All parties conspire in secrecy.

***. . . Lizzie was well known as a shoplifter in Fall River before the murders. Stores such as McWhirr's Dry Goods, Gifford's Jewelry Store and Cherry & Webb's knew to watch her and send the bills to her father.***

Incest survivors carry within them a mix of rage, guilt, and love toward their parents, and feelings of self-loathing. Relationships with others are modeled on relationships learned in the home, and incest survivors often have a very difficult time relating to others.[5] They are awkward, as Lizzie was awkward. Many come to feel their value is in their sexual attractiveness, as Lizzie who loved her fine clothes. Their relationship with other men, also modeled after relationships with their father, is troubled, and some avoid these relationships entirely, preferring the company of women. Apparently paradoxical, this desire to attract and then repel men is common and reflects the deep ambivalence they feel.

Kleptomania and other petty crimes also are seen in some incest survivors. The survivors have themselves been robbed. Crimes have been done in secret to them, and stealing may recreate these emotions in an attempt at mastery. Like Lizzie, kleptomaniacs do not steal from want or need. Just as Lizzie gave away the porcelain plates she took from Tilden-Thurber, kleptomaniacs often abandon or give away the stolen object. The point of the theft is not gain, but "getting away" with something forbidden, without detection, like incest.[6]

We will never know if incest occurred in the Borden household. Incest was rarely discussed 10 years ago, and was unthinkable 100 years ago. If the society then could not imagine she had murdered her father, even less could they imagine that she slept with him. In fact, however, incest is an epidemic that has been estimated to affect at least 1 in 5 women, and may have been no less common in the late Victorian era when children and women were almost regarded as the property of the male head of the household.

The incest hypothesis however, would also fit other facts about the case. Lizzie's sister Emma, also never married, was shy, retiring, and protective of Lizzie. Emma herself said that at Sarah Borden's death she became "the little mother." Since serial incest commonly occurs in multiple family members, she may have been abused as well. When Lizzie sent a message to Emma after the murders, she asked that it be phrased gently so that an old person living with her not be upset. Why did Lizzie not think that Emma herself would be upset?

After his first wife's death, Andrew Borden had remarried at age 43. He was wealthy, and one of the richest men in town. Why did he not marry a young, attractive woman to gratify his sexual needs and produce the male heir he is said to have wanted? Why did he instead marry a 38-year-old dowdy woman, possibly near menopause in those more difficult times? Perhaps his sexual needs were gratified elsewhere.

Also unclear is why the Borden sisters were so jealous of Abby. Although it has been frequently stated that Abby was mean or not likable, there is not a scintilla of evidence to support this from any of her contemporaries, other than Emma and Lizzie. They could not have been jealous of her beauty, fine wardrobe, or her wealth, as Andrew gave her less than

he gave her daughters. Emma and Lizzie were concerned that Abby would usurp their place, and perhaps not only in financial matters. At minimum here, is a confusion of boundaries, where what is due to the wife and what is due to the daughters becomes confused and blurred.

Did Uncle Morse have some knowledge or suspicion of incest? For if incest occurred, it may well have begun while his sister Sarah was alive, while Emma was a child. He may have sensed some disturbing family dynamics, even if he did not know the particulars. This could explain his ambivalence toward the murders, as he seemed never to clearly accuse or defend Lizzie, his niece.

The servant Bridget, the only other person in the house at the time of the murders, also is ambiguous, never clearly supporting or accusing Lizzie. Both Bridget and Morse seem to make just socially acceptable, minimal and factual statements, which Victorian reticence alone cannot explain if they wished to defend a Lizzie they knew to be innocent.

Finally, the murders. As the jurors noted, there was no evidence that Lizzie was ever a violent person. Some persons are in their characters destructive and violent, but this does not seem true of Lizzie. If she killed for money, one might expect that in later life she would continue to show a passion for building a fortune. But Lizzie never did this, living a solitary life with few friends. Her singular crime of violence was directed at only two people, and was never again symbolically reflected in any of her actions. Intense rage exploded out of her like a volcano, never to be repeated.

A history of incest could account for this. Novelist Anna Katherine Green, writing for the *Fall River Herald* at the time of the crime, was a defender of Lizzie because she did not think that the proposed motive of money made sense. She wrote "Mr. and Mrs. Borden were not only killed, but hacked, and this not because of resistance or from a desire to escape an alarm, but in face of non-resistance and an undoubted physical powerlessness, their energies having been previously paralyzed . . . by the first blow they received. A woman will strike and strike and strike again, perhaps with more unreasoning and unrelenting frenzy than a man, when her victim is a rival who has aroused her jealousy, or the man who has outraged her affections or robbed her of her children."

She continues, "To slay an aged father or even an aged mother from motives of anger from motives of anger or cupidity is possible to a woman even in this day and generation, as our papers frequently show, but to needlessly hack and hew them? What motive of rage could have been strong enough to carry Lizzie Borden through it? Revenge for money withheld, tastes crossed or desires unsatisfied, I cannot think so."[1]

Ms Green, therefore, thought that Lizzie was innocent. But we can think of a motive Ms Green could not: incest as a source of hate and thwarted love.

Finally, did Lizzie ever confess? Not overtly, but consider a verse from a hymn she had sung at her funeral, and loved so much she had the tile carved into her mantelpiece at Maplecroft to look upon every day of her life.

> The green leaf of loyalty's beginning to fall
> The Bonnie White Rose it is withering an' all.
> But I'll water it with the blood of usurping tyranny
> and green it will grow in my ain country.[7]

Psychologically, Lizzie may have seen the green leaf and the rose as her sister and herself. "I'll water it with the blood of usurping tyranny" speaks clearly of murder and death, which she boasts of as restoring her and her sister. Since the only deaths in her adult life were those of Andrew and Abby, this must be the deaths of the Bordens.

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# HEALTH BY NUMBERS

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## Bicycle Injuries in Rhode Island

Rhode Island's acute care hospitals submitted data to the Office of Health Statistics, Rhode Island Department of Health to develop a profile of serious injuries, resulting in the recently issued report, 1990 Rhode Island Injury Hospitalizations.1 Inpatients discharged with a diagnosis of injury between October 1, 1989 and September 30, 1990 were the study population. 1990 Census data were used to calculate hospitalization rates. The submitted data include the coded medical condition(s) responsible for hospital admission and, for 56% of cases, codes indicating the external cause of injury. It has not been determined if injuries with external cause codes are representative of all injury hospitalizations. (The full report is available on request from the Injury Prevention Program at the Rhode Island Department of Health.)

This paper presents findings based on discharges with a coded external cause of bicycle injury adapted from the full report. In 1990, there were 103 hospitalizations coded as bicycle crashes (2.3% of all coded injury hospitalizations). In only 20% of these cases did the bicycle collide with a motor vehicle, although motor vehicles are much more frequently involved in fatal injuries to bicyclists.

The hospitalization rate for males was more than three times the rate for females. Boys aged 5 to 14 were at highest risk (Figure 1), and comprised two-thirds of the male patients. Similarly, girls in this age group sustained about two-thirds of the injuries to females. Those aged 65 and older had no coded bicycle injuries in 1990.

Predictably, there was an elevated number of bicycle injury admissions during May through September. Nearly one-quarter of the admissions were in August.

Risk of bicycle injury was greater for those living in Low and Poverty socioeconomic status (SES) areas than for those in the Middle and High areas (Table 1). This difference was statistically significant ($p<.001$).

Head injuries among bicyclists are the basis for current national attention to the promotion of bicycle helmet use. As illustrated in Figure 2, the most common bicycle injuries (39%) were intracranial or skull fractures. This proportion is three and a-half times higher than the proportion of head injuries for all injury patients.

Median length of stay for injured bicyclists was 2 days (range: 0 to 58 days), as compared to a 4-day median stay for all injury patients. The average total charge per patient, for the 82 cases for whom this was known, was correspondingly low: $3,459 (range: $340 to $28,777). Almost all (97%) of the hospitalized bicyclists had routine discharges; no patients died before discharge.

Injury hospitalizations provide insight into the injury profile in Rhode Island supplementing an earlier study of fatal injuries.2 In the case of bicycle injuries, there are notable differences between mortality and morbidity data. While bicyclists comprise 0.5% of those fatally injured, they are almost five times more prevalent (2.3%) among coded injury hospitalizations. The number of bicycle injuries treated on an out-patient basis is currently not known.

There are a number of strategies available to prevent these injuries including bicycle safety education, enforcement of traffic laws, construction of bicycle paths, and use of bicycle helmets. Among the national objectives promulgated in Healthy People 2000, is "9.13 Increase the use of helmets to at least . . . 50% of bicyclists."3 According to data from the 1990 Rhode Island Health Interview Survey, only 20% of bicyclists own helmets; of whom two-thirds (14% of all bicyclists) state that they wear their helmets most or all of the time. The Rhode Island Chapter of the American Academy of Pediatrics is running a campaign to educate parents about the importance of helmet use. All physicians have the opportunity to promote helmet use among their patients.

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*Submitted by Thomas L. Largo, MPH and Ann Thacher-Renshaw, MS, Injury Prevention Program. Health by Numbers is edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD.*

**Fig 1 – Hospitalization rates for injured bicyclists by age and sex, Rhode Island, 1990**

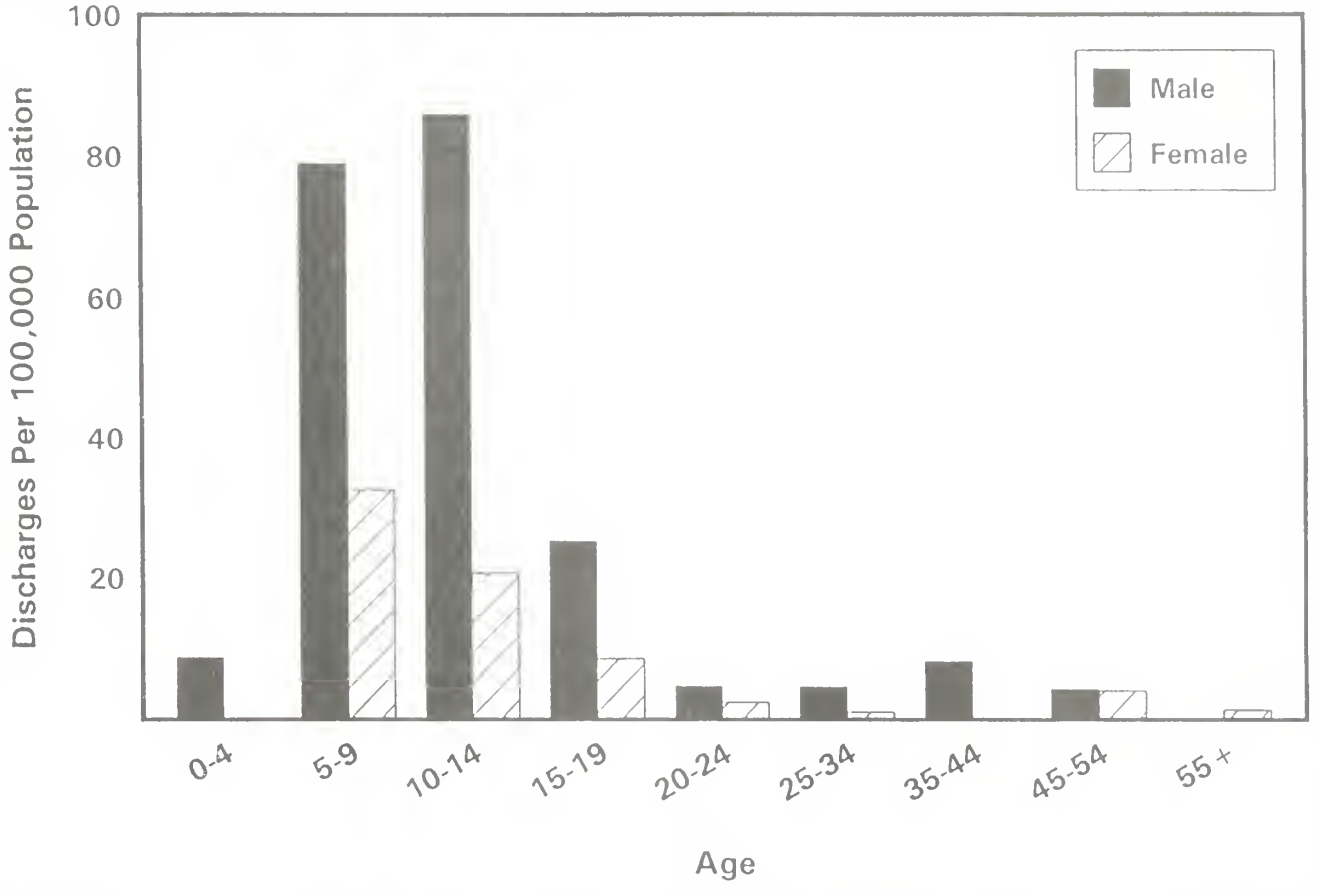


**Fig 2 – Hospitalizations to injured bicyclists by principal diagnosis, Rhode Island, 1990**

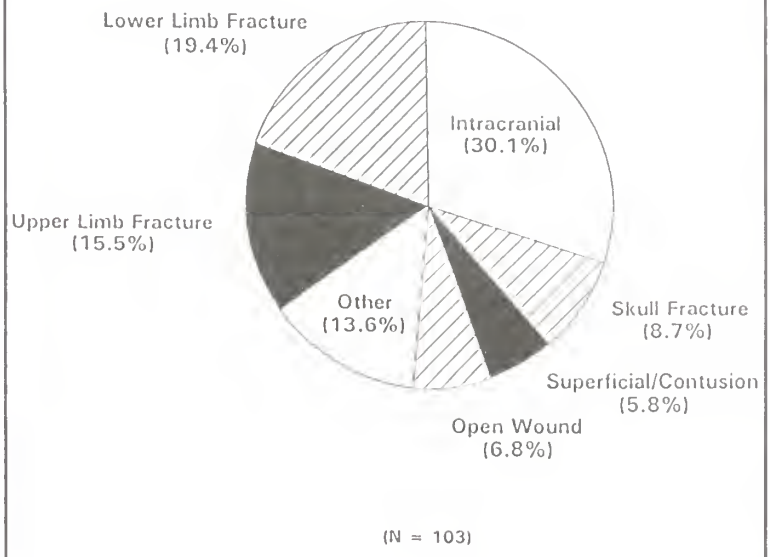


Table 1. Hospitalizations for bicycle injuries, by patient socioeconomic status determined by location (census tract) of patient residence, Rhode Island, 1990

| Socioeconomic Status | Number | Rate per 100,000 Population |
|---|---|---|
| Poverty | 22 | 16.3 |
| Low | 38 | 17.9 |
| Middle | 18 | 4.6 |

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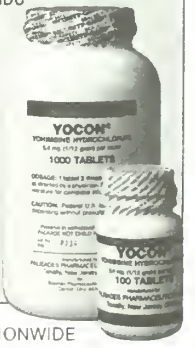


**References:**

1. A. Morales et al., New England Journal of Medicine: 1221. November 12, 1981.
2. Goodman, Gilman — The Pharmacological basis of Therapeutics 6th ed., p. 176-188. McMillan December Rev. 1/85.
3. Weekly Urological Clinical letter, 27:2, July 4, 1983.
4. A. Morales et al., The Journal of Urology 128: 45-47, 1982.

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THE RHODE ISLAND MEDICAL JOURNAL

The Official Organ of the Rhode Island Medical Society

Issued Monthly under the direction of the Publication Committee

VOLUME I
NUMBER I

PROVIDENCE, R. I., JANUARY, 1917

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# *THE RHODE ISLAND MEDICAL JOURNAL HERITAGE*

### Ninety Years Ago (February, 1903)

George S. Mathews MD, discusses his experience in the medical management of nontuberculous lung abscess. He describes the clinical course of two cases of pulmonic abscess caused by the Klebs-Loeffler bacillus. He summarizes his thoughts in six observations: 1) Lung abscess is usually a secondary infection; 2) It is far more common than clinical reports or mortuary records indicate; 3) The abscess cavity is difficult to locate with precision, requiring repeated physical examinations; 4) Tuberculosis is the commonest cause of lung abscess; 5) When the two pleural surfaces are not adherent, it is dangerous to use an exploring needle; and 6) After the physical signs are determined, a surgeon should be called.

JC Pegram, Jr, MD, describes five cases of intrapopliteal bursitis. The author first reviews the anatomy of the popliteal bursae, commenting on its variability. The commonest causes, according to the author, are gout, osteoarthritis and trauma.

The milk supply of Providence is discussed by Halsey DeWolf, MD. He notes that Rhode Island state laws define adulteration of milk (eg, the addition of water or other foreign substances; or specimens containing less than 2.5% milk fat) but these laws are silent on such issues as cleanliness of the herds, sanitary requirements in the collection process or the number of bacteria within milk samples. The author describes the deplorable circumstances surrounding the collection of milk in the state, particularly the filthy circumstances for the handling of milk and the unregulated status of the unsanitary milk containers. He mentions Professor Koch's latest theory regarding the transmission of bovine tuberculosis via milk as likely sources of intestinal and other diseases. Based upon the activist role of physicians in other communities, the author urges the adoption of a statewide milk commission. "Certainly after realizing what the medical profession in other cities has done in relation to this matter, it would seem impossible for this association to disclaim all responsibility in the endeavor to further so important a hygienic reform as the procuring of good milk."

The minutes of the medical society meeting are summarized including brief synopses of cases presented. These include instances of Pott's disease, exophthalmic goiter, and multiple bony fractures. The membership also learns that two grains of strychnine sulfate are not soluble in one drachm of water, and accordingly, they are advised to alter their customary prescriptions. Two new medical texts are reviewed: Volume VI of *A System of Physiologic Therapeutics*, devoted to dietotherapy; and a new volume on general paresis.

### Fifty Years Ago (February, 1943)

The lead article is the Providence Medical Association presidential address given by Henry E. Utter, MD. The sober tenor of this address reflects the gravity of the war that deeply affects Rhode Island at this time. "The 96th year of the Providence Medical Society has passed into history. 1942 has been a year when war has dominated the picture and one after another of our members has entered the armed forces until at the present moment 115 are serving their country at home or abroad in the common endeavor to subdue the enemy." The author discusses the concerns of the medical profession about socialized medicine. And while expressing concerns about the dehumanizing elements of government-directed medicine, he observes: "Whatever the future brings us we must study the trend and be prepared to join in whatever is right for the benefit of mankind. If socialized medicine is to be the cure for our ills, we must help the plan and give freely of our advice in matters pertaining to health. We have seen too many reforms which theoretically seemed perfect and yet which failed under operation."

Captain WL Leet, historian for the US Army 48th Evacuation Hospital, provides the *Journal*'s readers with a brief commentary on Rhode Island Hospital's military unit. The unit was activated on August 17, 1942 at Fort Devens, Massachusetts. At full complement, the mobile facility will consist of 50 medical and administrative officers, 50 nurses, and initially, about 200 enlisted personnel. The hospital is designed as a 750-bed unit capable of expanding to 1,000 beds. When operational it will double its enlisted complement. The tent hospital includes medical, surgical, laboratory and radiology components. After an interval of basic

field training, the unit was dispatched to Tennessee to participate in 2nd Army maneuvers. The entire hospital, including equipment, tents and personnel, can be moved in 25 railroad cars. The historian notes that the food is better than expected. Inoculations include those for smallpox, tetanus, typhoid, paratyphoid, cholera and typhus. The summary concludes with the following paragraph: "Suddenly, at the end of December 1942, all were summoned back, leaves were cancelled, passes were brief. The 48th was on alert, supposedly for foreign duty. On January 6, 1943, we boarded the train for our secret destination."

### Twenty-Five Years Ago (February, 1968)

The lead scientific article is contributed by CJ Bellavance, MD and discusses fibular fixation in the management of fractures or fracture-dislocations of both bones of the leg. The author concludes: "Personal experience in the use of internal fibular fixation as a method of treatment in an irreducible fracture-dislocation of the ankle and an unstable shaft fracture of both bones of the leg has been described. The experience of others, the anatomical considerations, and rationale have been reviewed. More extensive applications of the principles applied in this method appear to be justified."

HS Sturim, MD distinguishes between keloids and hypertrophic scars. Although they are similar in appearance, they are separate entities. "Most important in this regard is the invasion of normal tissue by keloid but not by hypertrophic scar. The occasional spontaneous regression or remission of the hypertrophic scar also serves to differentiate the lesions, as keloids do not remit." He concludes: "Recent encouraging results with intralesional injections of triamcinolene acetonide in both keloids and hypertrophic scars have been described."

GA Motta, MD, in his presidential address before the Providence Medical Association, discusses the changing complexion of medical care in the United States, stressing the need to preserve family practice.

Attempted suicide in adolescents is considered by AL Senseman, MD. He concludes: "We have under study 100 adolescents, 21 years of age and under, 56 of whom threatened or attempted suicide. While the incidence of successful suicide is low (2% in other reported cases), the attempts are many and often multiple in the same individual. The most frequent method used is overdose of a medication, usually prescribed by a physician. Two typical cases have been reported. A brief method for assessment has been described. This should be helpful in evaluating the young person who seeks help but does not reveal all of the thoughts and feeling which prompted the visit."

CL Hill, MD, describes conservation surgery for laryngeal and hypopharyngeal carcinoma.

HH Myers, MD, in an article entitled, Criminal Responsibility: Search for a Formula, describes how best a psychiatrist may assist the court in its deliberations. He observes, in considering the role of the forensic psychiatrist: "In brief, the problem of competency to stand trial consists of a determination of the accused's mental state not in relation to the crime but in relation to his trial. This concept comes to us out of common law which held that an individual could not be required to plead to an indictment or to be tried for a crime when he was so mentally disturbed that he could not understand the nature and object of the proceedings against him, understand his own position with reference to such proceedings, and assist in his defense."

SJ Goldowski, MD describes his medical visits to the state of Israel.

PL Mathieu, MD, and HE Darrah, MD, provide a report of the delegates to the National Conference on Health Care of the Poor, held in Chicago under the sponsorship of the AMA.

A report on therapeutic abortion is offered by the Society's Committee on Maternal Health and Medicine and Committee on Medicine and Religion. The concluding statement, adopted by the House of Delegates of the Society on January 24, 1968 states: "The Rhode Island Medical Society realizes that there can never be unanimity of opinion on the subject of therapeutic abortion because of theological or moral reasons, and therefore mandatory legislation should not be drafted; rather, no one who is opposed need have an abortion, and no physician opposed to the procedure need perform it."

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**Specifications**: Manuscripts should be typewritten on one side of the paper only, with double spacing and liberal margins, using 8½" x 11" non-erasable bond. Tables, charts, and legends should be submitted separately from the text and referred to by number (eg, Fig. 1 or Table 2, etc.) Number pages consecutively.

To expedite production and ensure accuracy, authors are **strongly encouraged** to submit articles as well as computer-generated tables and figures on floppy diskette, formatted in any major MS-DOS or Windows word processor (eg, Microsoft Word, Wordperfect, Wordstar, Xywrite, Multimate, etc.) Macintosh disks will be accepted provided text is saved in an ASCII file. If possible, Macintosh disks should be saved in DOS format, using Apple File Exchange. Diskettes must be accompanied with at least one printed copy of the manuscript. Diskettes will be returned upon request.

**Title page:** The first page of the manuscript should contain: (1) title of the contribution; (2) authors' name(s), highest academic degree, and institution; (3) address and phone number for communications; (4) a brief biographical description of each author, including specialty, practice location, academic appointment and hospital affiliation.

**Abbreviations**: Avoid the use of jargon and unnecessary abbreviations. Abbreviations used, especially of laboratory and diagnostic procedures, must be identified fully in the text within parentheses. If abbreviations are part of the text, the author(s) shall provide *Rhode Island Medicine* with a complete alphabetic list of such abbreviations with an explanation for each, on a separate page.

**References**: References shall be limited to those that are absolutely essential to the understanding of the article and should number no more than 20. The editor reserves the right to reduce the number when necessary. The author is responsible for the accuracy and complete information contained in the references. References should be compiled at the end of the article according to the order of citation in the text. In the text, they should be given as numerical superscripts. They should be typewritten, double-spaced under the heading "References." A complete journal reference includes: (1) authors' surnames and initials; (2) title of article and subtitle, if any; (3) abbreviated name of journal (abbreviations must conform to those used in the *Index Medicus*); (4) year; (5) volume number; (6) part or supplement number, when pertinent, and issue month or number when pagination is not consecutive throughout a volume; and (7) inclusive page numbers. A complete book reference includes (1) authors' surnames and initials; (2) surname and initials of editor or translator, or both, if any; (3) title of book and subtitle, if any; (4) number of editions after the first; (5) place of publication; (6) name of publisher; (7) year of publication; (8) volume number, if more than one; and (9) page numbers, if specific pages are cited. References should conform to the punctuation and style set forth in the American Medical Association's *Manual of Style,* 8th ed.:

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1. Feinfeld DA, al-Achkar G, Lipner HI, Chirayil SJ, Hakim J, Avram MM. Syndrome of inappropriate secretion of antidiuretic hormone: Association with cavernous sinus thrombosis. *JAMA*. 1978;240:856-857.

**Books:**

2. Hollingworth JW. *Local and Systemic Complications of Rheumatoid Arthritis*. Philadelphia, Pa: Saunders; 1968.

**Book Chapter**

3. Epstein WL. Erythema nodosum. In: Samter M, ed. *Immunological Diseases*, 2nd ed. Boston, Mass.: Little, Brown; 1971;2:944-951.

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*Rhode Island Medicine* (publication no. 1061222X) is published monthly for $40 a year by the Rhode Island Medical Society, 106 Francis Street, Providence, RI 02903. Editor is Stanley Aronson, MD, Brown University, Box G, Providence, RI 02912, and Managing Editor is Anne Christner, PhD, Manisses Communications Group, Inc., 205 Governor Street, Providence, RI 02906. *Rhode Island Medicine* has an average monthly circulation of 1734. The average number of copies per issue printed during the past year is 1830: 66 complimentary subscriptions and 30 for office use. The circulation of the single issue published nearest to the filing date of October 20, 1992 was 1734. The actual number of copies of the single issue printed nearest to the filing date was 1830: 66 complimentary subscriptions and 30 for office use.

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## WARNINGS

**Liver Enzymes:** HMG-CoA reductase inhibitors, like some other lipid-lowering therapies, have been associated with biochemical abnormalities of liver function. Increases of serum transaminase (ALT, AST) values to more than 3 times the upper limit of normal occurring on 2 or more (not necessarily sequential) occasions have been reported in 1.3% of patients treated with pravastatin in the U.S. over an average period of 18 months. These abnormalities were not associated with cholestasis and did not appear to be related to treatment duration. In those patients in whom these abnormalities were believed to be related to pravastatin and who were discontinued from therapy, the transaminase levels usually fell slowly to pretreatment levels. These biochemical findings are usually asymptomatic although worldwide experience indicates that anorexia, weakness, and/or abdominal pain may also be present in rare patients.

As with other lipid-lowering agents, liver function tests should be performed during therapy with pravastatin. Serum aminotransferases, including ALT (SGPT), should be monitored before treatment begins, every six weeks for the first three months, every eight weeks during the remainder of the first year, and periodically thereafter (e.g., at about six-month intervals). Special attention should be given to patients who develop increased transaminase levels. Liver function tests should be repeated to confirm an elevation and subsequently monitored at more frequent intervals. If increases in AST and ALT equal or exceed three times the upper limit of normal and persist, then therapy should be discontinued. Persistence of significant aminotransferase elevations following discontinuation of therapy may warrant consideration of liver biopsy.

Active liver disease or unexplained transaminase elevations are contraindications to the use of pravastatin (see CONTRAINDICATIONS). Caution should be exercised when pravastatin is administered to patients with a history of liver disease or heavy alcohol ingestion (see CLINICAL PHARMACOLOGY: Pharmacokinetics/Metabolism). Such patients should be closely monitored, started at the lower end of the recommended dosing range, and titrated to the desired therapeutic effect.

**Skeletal Muscle: Rhabdomyolysis with renal dysfunction secondary to myoglobinuria has been reported with pravastatin and other drugs in this class.** Uncomplicated myalgia has also been reported in pravastatin-treated patients (see ADVERSE REACTIONS). Myopathy, defined as muscle aching or muscle weakness in conjunction with increases in creatine phosphokinase (CPK) values to greater than 10 times the upper limit of normal was reported to be possibly due to pravastatin in only one patient in clinical trials (<0.1%). Myopathy should be considered in any patient with diffuse myalgias, muscle tenderness or weakness, and/or marked elevation of CPK. Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever. **Pravastatin therapy should be discontinued if markedly elevated CPK levels occur or myopathy is diagnosed or suspected. Pravastatin therapy should also be temporarily withheld in any patient experiencing an acute or serious condition predisposing to the development of renal failure secondary to rhabdomyolysis, e.g., sepsis; hypotension; major surgery; trauma; severe metabolic, endocrine, or electrolyte disorders; or uncontrolled epilepsy.**

The risk of myopathy during treatment with lovastatin is increased if therapy with either cyclosporine, gemfibrozil, erythromycin, or niacin is administered concurrently. There is no experience with the use of pravastatin together with cyclosporine. Myopathy has not been observed in clinical trials involving small numbers of patients who were treated with pravastatin together with niacin. One trial of limited size involving combined therapy with pravastatin and gemfibrozil showed a trend toward more frequent CPK elevations and patient withdrawals due to musculoskeletal symptoms in the group receiving combined treatment as compared with the groups receiving placebo, gemfibrozil, or pravastatin monotherapy. Myopathy was not reported in this trial (see PRECAUTIONS: Drug Interactions). One patient developed myopathy when clofibrate was added to a previously well tolerated regimen of pravastatin, the myopathy resolved when clofibrate therapy was stopped and pravastatin treatment continued. **The use of fibrates alone may occasionally be associated with myopathy. The combined use of pravastatin and fibrates should generally be avoided.**

## PRECAUTIONS

**General:** Pravastatin may elevate creatine phosphokinase and transaminase levels (see ADVERSE REACTIONS). This should be considered in the differential diagnosis of chest pain in a patient on therapy with pravastatin.

*Homozygous Familial Hypercholesterolemia.* Pravastatin has not been evaluated in patients with rare homozygous familial hypercholesterolemia. In this group of patients, it has been reported that HMG-CoA reductase inhibitors are less effective because the patients lack functional LDL receptors.

*Renal Insufficiency.* A single 20 mg oral dose of pravastatin was administered to 24 patients with varying degrees of renal impairment (as determined by creatinine clearance). No effect was observed on the pharmacokinetics of pravastatin or its 3α-hydroxy isomeric metabolite (SQ 31,906). A small increase was seen in mean AUC values and half-life ($t_{1/2}$) for the inactive enzymatic ring hydroxylation metabolite (SQ 31,945). Given this small sample size, the dosage administered, and the degree of individual variability, patients with renal impairment who are receiving pravastatin should be closely monitored.

**Information for Patients:** Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever.

**Drug Interactions:** *Immunosuppressive Drugs, Gemfibrozil, Niacin (Nicotinic Acid), Erythromycin.* See WARNINGS: Skeletal Muscle.

*Antipyrine.* Clearance by the cytochrome P450 system was unaltered by concomitant administration of pravastatin. Since pravastatin does not appear to induce hepatic drug-metabolizing enzymes, it is not expected that any significant interaction of pravastatin with other drugs (e.g., phenytoin, quinidine) metabolized by the cytochrome P450 system will occur.

*Cholestyramine/Colestipol.* Concomitant administration resulted in an approximately 40 to 50% decrease in the mean AUC of pravastatin. However, when pravastatin was administered 1 hour before or 4 hours after cholestyramine or 1 hour before colestipol and a standard meal, there was no clinically significant decrease in bioavailability or therapeutic effect. (See DOSAGE AND ADMINISTRATION: Concomitant Therapy.)

*Warfarin:* In a study involving 10 healthy male subjects given pravastatin and warfarin concomitantly for 6 days, bioavailability parameters at steady state for pravastatin (parent compound) were not altered. Pravastatin did not alter the plasma protein-binding of warfarin. Concomitant dosing did increase the AUC and Cmax of warfarin but did not produce any changes in its anticoagulant action (i.e., no increase was seen in mean prothrombin time after 6 days of concomitant therapy). However, bleeding and extreme prolongation of prothrombin time has been reported with another drug in this class. Patients receiving warfarin-type anticoagulants should have their prothrombin times closely monitored when pravastatin is initiated or the dosage of pravastatin is changed.

*Cimetidine.* The $AUC_{0\text{-}12h}$ for pravastatin when given with cimetidine was not significantly different from the AUC for pravastatin when given alone. A significant difference was observed between the AUC's for pravastatin when given with cimetidine compared to when administered with antacid.

*Digoxin.* In a crossover trial involving 18 healthy male subjects given pravastatin and digoxin concurrently for 9 days, the bioavailability parameters of digoxin were not affected. The AUC of pravastatin tended to increase, but the overall bioavailability of pravastatin plus its metabolites SQ 31,906 and SQ 31,945 was not altered.

*Gemfibrozil.* In a crossover study in 20 healthy male volunteers given concomitant single doses of pravastatin and gemfibrozil, there was a significant decrease in urinary excretion and protein binding of pravastatin. In addition, there was a significant increase in AUC, Cmax, and Tmax for the pravastatin metabolite SQ 31,906. Combination therapy with pravastatin and gemfibrozil is generally not recommended.

In interaction studies with *aspirin, antacids* (1 hour prior to PRAVACHOL), *cimetidine, nicotinic acid,* or *probucol,* no statistically significant differences in bioavailability were seen when PRAVACHOL (pravastatin sodium) was administered.

*Other Drugs.* During clinical trials, no noticeable drug interactions were reported when PRAVACHOL was added to diuretics, antihypertensives, digitalis, converting-enzyme inhibitors, calcium channel blockers, beta-blockers, or nitroglycerin.

**Endocrine Function:** HMG-CoA reductase inhibitors interfere with cholesterol synthesis and lower circulating cholesterol levels and, as such, might theoretically blunt adrenal or gonadal steroid hormone production. Results of clinical trials with pravastatin in males and post-menopausal females were inconsistent with regard to possible effects of the drug on basal steroid hormone levels. In a study of 21 males, the mean testosterone response to human chononic gonadotropin was significantly reduced ($p<0.004$) after 16 weeks of treatment with 40 mg of pravastatin. However, the percentage of patients showing a ≥50% rise in plasma testosterone after human chononic gonadotropin stimulation did not change significantly after therapy in these patients. The effects of HMG-CoA reductase inhibitors on spermatogenesis and fertility have not been studied in adequate numbers of patients. The effects, if any, of pravastatin on the pituitary-gonadal axis in pre-menopausal females are unknown. Patients treated with pravastatin who display clinical evidence of endocrine dysfunction should be evaluated appropriately. Caution should also be exercised if an HMG-CoA reductase inhibitor or other agent used to lower cholesterol levels is administered to patients also receiving other drugs (e.g., ketoconazole, spironolactone, cimetidine) that may diminish the levels or activity of steroid hormones.

**CNS Toxicity:** CNS vascular lesions, characterized by perivascular hemorrhage and edema and mononuclear cell infiltration of perivascular spaces, were seen in dogs treated with pravastatin at a dose of 25 mg/kg/day, a dose that produced a plasma drug level about 50 times higher than the mean drug level in humans taking 40 mg/day. Similar CNS vascular lesions have been observed with several other drugs in this class.

A chemically similar drug in this class produced optic nerve degeneration (Wallerian degeneration of retinogeniculate fibers) in clinically normal dogs in a dose-dependent fashion starting at 60 mg/kg/day, a dose that produced mean plasma drug levels about 30 times higher than the mean drug level in humans taking the highest recommended dose (as measured by total enzyme inhibitory activity). This same drug also produced vestibulocochlear Wallerian-like degeneration and retinal ganglion cell chromatolysis in dogs treated for 14 weeks at 180 mg/kg/day, a dose which resulted in a mean plasma drug level similar to that seen with the 60 mg/kg dose.

**Carcinogenesis, Mutagenesis, Impairment of Fertility:** In a 2-year study in rats fed pravastatin at doses of 10, 30, or 100 mg/kg body weight, there was an increased incidence of hepatocellular carcinomas in males at the highest dose ($p<0.01$). Although rats were given up to 125 times the human dose (HD) on a mg/kg body weight basis, their serum drug levels were only 6 to 10 times higher than those measured in humans given 40 mg pravastatin as measured by AUC.

The oral administration of 10, 30, or 100 mg/kg (producing plasma drug levels approximately 0.5 to 5.0 times human drug levels at 40 mg) of pravastatin to mice for 22 months resulted in a statistically significant increase in the incidence of malignant lymphomas in treated females when all treatment groups were pooled and compared to controls ($p<0.05$). The incidence was not dose-related and male mice were not affected.

A chemically similar drug in this class was administered to mice for 72 weeks at 25, 100, and 400 mg/kg body weight, which resulted in mean serum drug levels approximately 3, 15, and 33 times higher than the mean human serum drug concentration (as total inhibitory activity) after a 40 mg oral dose. Liver carcinomas were significantly increased in high-dose females and mid- and high-dose males, with a maximum incidence of 90 percent in males. The incidence of adenomas of the liver was significantly increased in mid- and high-dose females. Drug treatment also significantly increased the incidence of lung adenomas in mid- and high-dose males and females. Adenomas of the eye Hardenan gland (a gland of the eye of rodents) were significantly higher in high-dose mice than in controls.

No evidence of mutagenicity was observed *in vitro*, with or without rat-liver metabolic activation, in the following studies: microbial mutagen tests, using mutant strains of *Salmonella typhimurium* or *Escherichia coli*; a forward mutation assay in L5178Y TK +/− mouse lymphoma cells; a chromosomal aberration test in hamster cells; and a gene conversion assay using *Saccharomyces cerevisiae*. In addition, there was no evidence of mutagenicity in either a dominant lethal test in mice or a micronucleus test in mice.

In a study in rats, with daily doses up to 500 mg/kg, pravastatin did not produce any adverse effects on fertility or general reproductive performance. However, in a study with another HMG-CoA reductase inhibitor, there was decreased fertility in male rats treated for 34 weeks at 25 mg/kg body weight, although this effect was not observed in a subsequent fertility study when this same dose was administered for 11 weeks (the entire cycle of spermatogenesis, including epididymal maturation). In rats treated with this same reductase inhibitor at 180 mg/kg/day, seminiferous tubule degeneration (necrosis and loss of spermatogenic epithelium) was observed. Although not seen with pravastatin, two similar drugs in this class caused drug-related testicular atrophy, decreased spermatogenesis, spermatocytic degeneration, and giant cell formation in dogs. The clinical significance of these findings is unclear.

**Pregnancy: Pregnancy Category X:** See CONTRAINDICATIONS.

Safety in pregnant women has not been established. Pravastatin was not teratogenic in rats at doses up to 1000 mg/kg daily or in rabbits at doses of up to 50 mg/kg daily. These doses resulted in 20× (rabbit) or 240× (rat) the human exposure based on surface area (mg/meter$^2$). However, in studies with another HMG-CoA reductase inhibitor, skeletal malformations were observed in rats and mice. PRAVACHOL (pravastatin sodium) should be administered to women of child-bearing potential only when such patients are highly unlikely to conceive and have been informed of the potential hazards. If the woman becomes pregnant while taking PRAVACHOL (pravastatin sodium), it should be discontinued and the patient advised again as to the potential hazards to the fetus.

**Nursing Mothers:** A small amount of pravastatin is excreted in human breast milk. Because of the potential for serious adverse reactions in nursing infants, women taking PRAVACHOL should not nurse (see CONTRAINDICATIONS).

**Pediatric Use:** Safety and effectiveness in individuals less than 18 years old have not been established. Hence, treatment in patients less than 18 years old is not recommended at this time. (See also PRECAUTIONS: **General**.)

## ADVERSE REACTIONS

Pravastatin is generally well tolerated, adverse reactions have usually been mild and transient. In 4-month long placebo-controlled trials, 1.7% of pravastatin-treated patients and 1.2% of placebo-treated patients were discontinued from treatment because of adverse experiences attributed to study drug therapy; this difference was not statistically significant. In long-term studies, the most common reasons for discontinuation were asymptomatic serum transaminase increases and mild, non-specific gastrointestinal complaints. During clinical trials the overall incidence of adverse events in the elderly was not different from the incidence observed in younger patients.

**Adverse Clinical Events:** All adverse clinical events (regardless of attribution) reported in more than 2% of pravastatin-treated patients in the placebo-controlled trials are identified in the table below; also shown are the percentages of patients in whom these medical events were believed to be related or possibly related to the drug.

| | All Events % | | Events Attributed to Study Drug % | |
|---|---|---|---|---|
| Body System/Event | Pravastatin (N = 900) | Placebo (N = 411) | Pravastatin (N = 900) | Placebo (N = 411) |
| Cardiovascular | | | | |
| Cardiac Chest Pain | 4.0 | 3.4 | 0.1 | 0.0 |
| Dermatologic | | | | |
| Rash | 4.0* | 1.1 | 1.3 | 0.9 |
| Gastrointestinal | | | | |
| Nausea/Vomiting | 7.3 | 7.1 | 2.9 | 3.4 |
| Diarrhea | 6.2 | 5.6 | 2.0 | 1.9 |
| Abdominal Pain | 5.4 | 6.9 | 2.0 | 3.9 |
| Constipation | 4.0 | 7.1 | 2.4 | 5.1 |
| Flatulence | 3.3 | 3.6 | 2.7 | 3.4 |
| Heartburn | 2.9 | 1.9 | 2.0 | 0.7 |
| General | | | | |
| Fatigue | 3.8 | 3.4 | 1.9 | 1.0 |
| Chest Pain | 3.7 | 1.9 | 0.3 | 0.2 |
| Influenza | 2.4* | 0.7 | 0.0 | 0.0 |
| Musculoskeletal | | | | |
| Localized Pain | 10.0 | 9.0 | 1.4 | 1.5 |
| Myalgia | 2.7 | 1.0 | 0.6 | 0.0 |
| Nervous System | | | | |
| Headache | 6.2 | 3.9 | 1.7* | 0.2 |
| Dizziness | 3.3 | 3.2 | 1.0 | 0.5 |
| Renal/Genitourinary | | | | |
| Urinary Abnormality | 2.4 | 2.9 | 0.7 | 1.2 |
| Respiratory | | | | |
| Common Cold | 7.0 | 6.3 | 0.0 | 0.0 |
| Rhinitis | 4.0 | 4.1 | 0.1 | 0.0 |
| Cough | 2.6 | 1.7 | 0.1 | 0.0 |

*Statistically significantly different from placebo.

The following effects have been reported with drugs in this class:

*Skeletal:* myopathy, rhabdomyolysis.

*Neurological:* dysfunction of certain cranial nerves (including alteration of taste, impairment of extra-ocular movement, facial paresis), tremor, vertigo, memory loss, paresthesia, peripheral neuropathy, peripheral nerve palsy.

*Hypersensitivity Reactions:* An apparent hypersensitivity syndrome has been reported rarely which has included one or more of the following features: anaphylaxis, angioedema, lupus erythematous-like syndrome, polymyalgia rheumatica, vasculitis, purpura, thrombocytopenia, leukopenia, hemolytic anemia, positive ANA, ESR increase, arthritis, arthralgia, urticaria, asthenia, photosensitivity, fever, chills, flushing, malaise, dyspnea, toxic epidermal necrolysis, erythema multiforme, including Stevens-Johnson syndrome.

*Gastrointestinal:* pancreatitis, hepatitis, including chronic active hepatitis, cholestatic jaundice, fatty change in liver, and, rarely, cirrhosis, fulminant hepatic necrosis, and hepatoma, anorexia, vomiting.

*Reproductive:* gynecomastia, loss of libido, erectile dysfunction.

*Eye:* progression of cataracts (lens opacities), ophthalmoplegia.

**Laboratory Test Abnormalities:** Increases in serum transaminase (ALT, AST) values and CPK have been observed (see WARNINGS).

Transient, asymptomatic eosinophilia has been reported. Eosinophil counts usually returned to normal despite continued therapy. Anemia, thrombocytopenia, and leukopenia have been reported with other HMG-CoA reductase inhibitors.

**Concomitant Therapy:** Pravastatin has been administered concurrently with cholestyramine, colestipol, nicotinic acid, probucol and gemfibrozil. Preliminary data suggest that the addition of either probucol or gemfibrozil to therapy with lovastatin or pravastatin is **not** associated with greater reduction in LDL-cholesterol than that achieved with lovastatin or pravastatin alone. No adverse reactions unique to the combination of an adsorbent to those previously reported for each drug alone have been reported. Myopathy and rhabdomyolysis (with or without acute renal failure) have been reported when another HMG-CoA reductase inhibitor was used in combination with immunosuppressive drugs, gemfibrozil, erythromycin, or lipid-lowering doses of nicotinic acid. Concomitant therapy with HMG-CoA reductase inhibitors and these agents is generally not recommended. (See WARNINGS: **Skeletal Muscle** and PRECAUTIONS: **Drug Interactions**.)

## OVERDOSAGE

There have been no reports of overdoses with pravastatin.

Should an accidental overdose occur, treat symptomatically and institute supportive measures as required.

(J4-422A)

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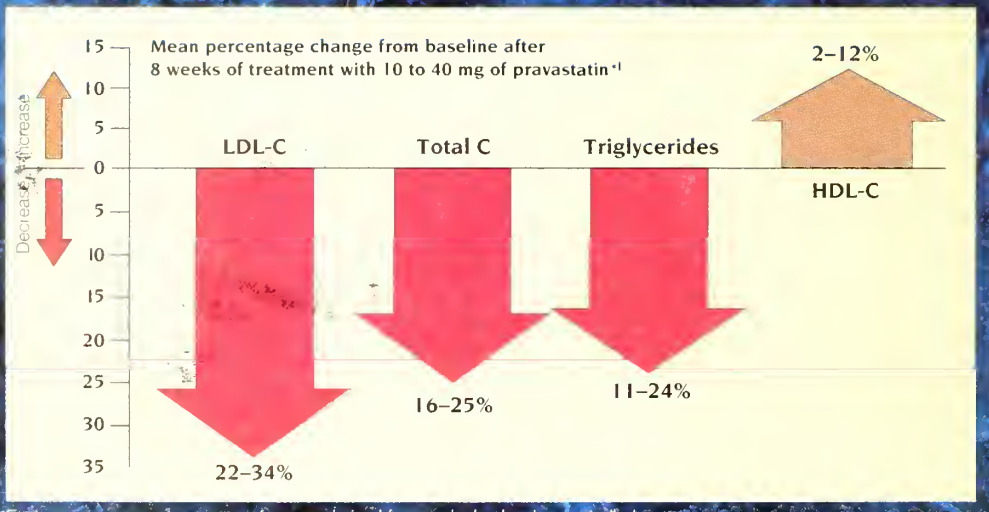


*Each arrow represents a range of means derived from a single placebo-controlled study that included 55 patients treated with pravastatin.

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**Reference: 1.** Jones PH, et al. Once-daily pravastatin in patients with primary hypercholesterolemia: a dose-response study. *Clin Cardiol* 1991;14:146-151.

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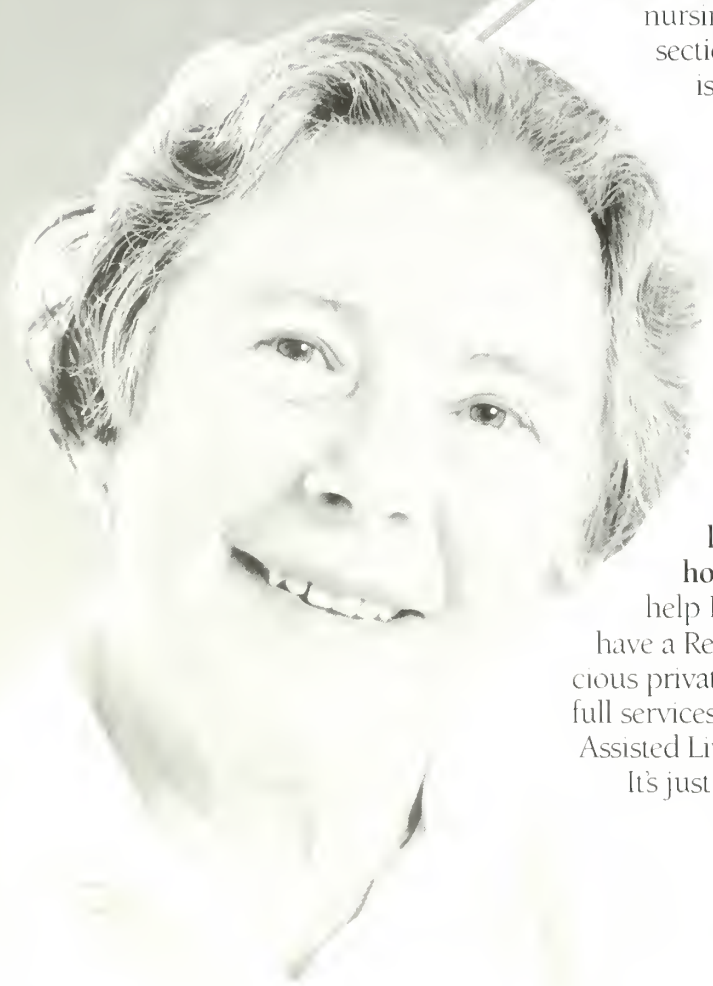
MEDICINE

March 1993

Volume 76, Number 3

# *Giving Back:*
# *Volunteerism and the Rhode Island Physician*

# "Just because I need a little help doesn't mean I need a nursing home."



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**Cover:** An orphan in Negru Voda, Romania.


**Rhode Island Medicine** is owned and published monthly by the Rhode Island Medical Society, 106 Francis Street, Providence, Rhode Island 02903, Ph: 401-331-3207. Single copies $4.00 — Subscriptions $40.00 per year (members of the Rhode Island Medical Society — $5.00 annually). Published articles represent opinions of the authors and do not necessarily reflect the official policy of the Rhode Island Medical Society unless clearly specified. Advertisements do not imply sponsorship or endorsement by the Rhode Island Medical Society. Second class postage paid at Providence, Rhode Island. **ISSN 1061-222X.** POSTMASTER: Send address changes to RHODE ISLAND MEDICINE, 106 Francis Street, Providence, RI 02903. National Advertising Bureau: State Medical Journal Advertising Bureau, Inc., 711 South Blvd., Oak Park, Illinois 60302. Phone 708-383-8800.

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# COMMENTARIES

## Into Whatsoever Houses I Enter

We are what we produce. Perhaps, we are what we possess. An alternative belief, however, might be that we are what we give away. Not what we can afford to give away, which is *noblesse oblige;* nor what we discard, often disguised as charity; but the gifts we voluntarily bestow, which are of ourselves and given with human compassion for the receiver. These gifts are what define us.

And what greater gift can physicians contribute than their time, their professional skills and the commitment of their spirit? This issue of *Rhode Island Medicine* describes how a sampling of our colleagues invest some of their time when not in the conventional business of medicine. Truly, they give at the office – and beyond.

We often take for granted many avenues of physician-generosity. For example, about one-fifth of Rhode Island's physicians hold unsalaried faculty appointments at Brown where they contribute materially to the professional education of their young colleagues and exert a palpable influence upon their developing attitudes toward others. Some of these unpaid clinical faculty (such as the surgeon Martin Felder, the pediatrician Jay Orson or the researcher James McIlwain) have been cited year after year by the Brown medical students as outstanding teachers and moral guides. The number of anonymous physicians who volunteer their services to Hospice Care, to churches and synagogues, to every laudable community endeavor, is legion.

Some physicians recall their army service where one of the three cardinal canons impressed upon them during their basic training was: "never volunteer." Clearly they have outgrown this narrow rule of survival and have persistently volunteered in countless ways, on behalf of varieties of civilian (and military) causes – to the great enrichment of Rhode Island and lands beyond. They gave their services, and continue to give, without coercion, without a secret purpose, and without an expectation of return. There may be a certain pardonable vanity in giving, but in this world only the ants appear to have achieved perfect altruism.

Is volunteering one's services something beyond the domain of formal medicine? Most physicians, actually, view it as an indivisible part of their work. And in the words of L.M. Johnston, MD, author of the first paper in this issue, "Volunteering service to homeless and impoverished populations is, in a sense, continuing education, exposing physicians to problems uncommonly identified in private offices." These diverse volunteer activities – domestic and international – which we read about in this issue are what we expect of our colleagues and ourselves. They are in keeping with a pledge made years ago: "Into whatsoever houses I enter, I will enter to help the sick . . . ."

Further information about local volunteering opportunities for physicians may be obtained by writing Margaret Coloian, MSJ, The Rhode Island Medical Society, 106 Francis St., Providence, RI 02903.

Margaret Coloian, MSJ
Stanley M. Aronson, MD

## Gender Benders

The body employs an unspoken language such that posture, gesture and facial expression often will convey more reliable information than the accompanying words. This suggests that words, separated from the speaker, are just neutral messengers with no capacity to provide nuance beyond their assigned meanings. In truth though, English is so rich in subtlety that its words possess a body language of their own. For example, language employs nouns that can be rendered gender-specific (ie, made female) by assigning suffixes such as *-ess, -ette,* or *-trix.* Thus we have authors and authoresses, ushers and usherettes, aviators and aviatrixes. So far, we seem to have a neat and unprejudiced symmetry. But on closer inspection a distinct imbalance emerges. In a manner akin to the scriptural origins of Adam and Eve, this gender-determining process also tells us that the original form was invariably the male and that the female "variant" was devised as an afterthought. The French suffix, *ette,* conveys still further meanings: it suggests both femaleness

(eg, suffragette) and, independently, the quality of diminutiveness (eg, cigar and cigarette). The *-ette* ending in some words also imparts to the root the derogatory sense of something less than real, or synthetic, as in the case of leatherette.

The problem is compounded when the same word – with just a soupçon of a gender-determining suffix – can add an unspoken but unmistakably sexist twist to the core definition. When male and female meanings (more properly, *perceived* meanings) depart substantively from each other, with but rare exceptions, it is the female form of the noun that carries the demeaning or diminishing connotation. For example, an adventurer is defined as a seeker of fortune in daring enterprises; an adventuress, on the other hand, is defined as a female who schemes to obtain wealth and position by unscrupulous methods. So, too, the word temptress carries a more sinister meaning than does the word tempter. (Sexually imbued temptations always seem to be more hazardous than the more bland kinds.)

The standard definition of host is one who entertains in his own home, is a landlord or perhaps a master of ceremonies; archaically, it means an army, or when capitalized, Host assumes an ecclesiastical meaning. In any of these definitions, the word presents a magisterial face. A hostess, on the other hand, is thought of as someone who assists patrons in a saloon, a commercial dancer or, rarely, a madam in a house of prostitution. Being a hostess, at times, may indeed be a respectable occupation, but the unadorned word suggests a calling that parents would not happily accept for their daughters, at least not without extensive explanation. A steward is said to be a supervisor who manages another person's properties or finances; the duties of a stewardess, on the other hand, are confined to such trivialities as the culinary needs of airline passengers. A major is a high military rank while a majorette is a baton twirler on autumn Saturday afternoons, a marginal diversion separating the two halves of a football game.

The point in illustrating some of these gender-oriented comparisons, of course, is the critical need to recognize the tyranny of certain words, which speak one message but, with a sly wink, whisper yet another. And rarely if ever are those *sotto voce* murmurs of a complimentary nature. Changing a bland suffix may create subtle changes in meaning. Pascal observed that few men speak humbly of humility, chastely of chastity or skeptically of skepticism. Supplying suffixes to nouns can cause additional dangers when they confer a meaning, intended or not, or a bias, spoken or not, upon the root word. Vigilance is called for when using this language of ours. For example, it has been observed that infants have less fun in infancy than do adults in adultery. Bluntness has its virtues.

Stanley M. Aronson, MD

## The Language of Epidemiology (XVI): Cohort Studies

The imperial Roman army was a model of institutional organization. At its height during the reign of Caesar Augustus it was composed of 28 legions; each legion was made up of 60 centuries, some 6,000 professional soldiers. The administrative and social core of the legion was the cohort, a unit of 10 centuries often on permanent assignment to some fortified frontier station that surrounded an inner defensible court-yard (Latin, *cohors,* meaning enclosure; from a Greek word, *hortus,* meaning enclosed gardens.) Those assigned to this defensive element, often provincials, absorbed its name and were referred to collectively as the cohort, comprising about 600 infantry. The normal term of enlistment at this time was 20 years and cohort members were typically career soldiers with wives and children permanently encamped nearby. During the extended time of Pax Romanus these fortified sites evolved into small urban centers. The sons of the Roman infantry frequently enlisted in the local unit and each Roman cohort came to assume a homogeneity of its own in terms of dialect, ethnicity and social values.

The word *cohort* has undergone a series of transformations from its initial meaning of an enclosed garden; it then came to signify a 10th part of a Roman legion; then to any military unit (such as Byron's "The Assyrian came down like the wolf on the fold, and his cohorts were gleaming in purple and gold"); then to a company of persons – military or not – with a common purpose; and currently, to a group of individuals with shared demographic and physiologic characteristics.

In epidemiology, a cohort is defined as a group of similar individuals (ie, similar in age, gender, etc.) who share a common experience or exposure.

Prior columns in this series have described the case-control method of epidemiologic inquiry. While this retrospective method of population analysis has the merit of yielding rapid answers to questions concerning causal relationships, it nevertheless is frequently flawed by lurking biases (cf. column XV). The most intuitively obvious of all epidemiologic methods becomes the prospective analysis, sometimes called the cohort study. And while the method is time-consuming and expensive, it remains the gold standard of epidemiologic analysis.

There are three necessary components to an *observational* cohort study:

1. Members of the cohort share a common profile (eg, age, gender, ethnicity, occupation).
2. After a specific exposure (eg, working in a particular industry, smoking, eating or not eating meat) certain outcomes (eg, emergence of a particular disease, or death) will be observed and recorded for all members of the cohort.
3. There will be a prospective interval of observation (often years or decades) during which time all cohort members still alive will be subjected to the same modalities of observation.

The simplest form of cohort study is employed by vital statisticians who

identify all individuals of a certain gender, born at a certain site and in a certain year and follow them until death occurs. This survivorship study generates our life expectancy tables, the actuarial basis of the life insurance industry. Sometimes the causes of death are also recorded (as in the Framingham study) and attempts are made to correlate these causes with diagnostic findings (eg, serum cholesterol levels) recorded earlier in life.

The cohort might be more narrowly defined as "males, ages 56 to 65 with colon cancer." The resulting data, appropriately organized, will then tell us something numeric about survivorship with this specific disease (eg, 5-year survival rates).

Alternatively, the cohort might be a group of workers exposed to some chemical or physical byproduct of a particular industry or craft. The exposure factor might be, for example, asbestos and the outcome measurement, lung cancer. Since, in the real world, workers change jobs or are promoted, factories close or are converted to other functions, the associative relationship between the exposure and the outcome must be expressed quantitatively. Smaller cohorts, each defined by years of exposure, are separately examined. After an interval of, say, 20 years of observation, zero years of exposure might yield a certain incidence rate of lung cancer, 1 year of exposure another rate, 2 years of exposure still another rate, and so on. A causal relationship may, or may not, then become apparent. And if it does become apparent, a positive correlation between years of exposure and rates of outcome (ie, a dose-relationship) might emerge.

The examples cited above are varieties of longitudinal observation. When there is designed, conscious intervention, when a homogeneous cohort is segregated into groups with some intentionally receiving some exposure (eg, a particular medication) and some not, the analysis then becomes an *experimental* cohort study.

The next column will discuss the mechanics of experimental cohort studies such as therapeutic or randomized clinical trials. The advantages and disadvantages of cohort studies in general will be explored.

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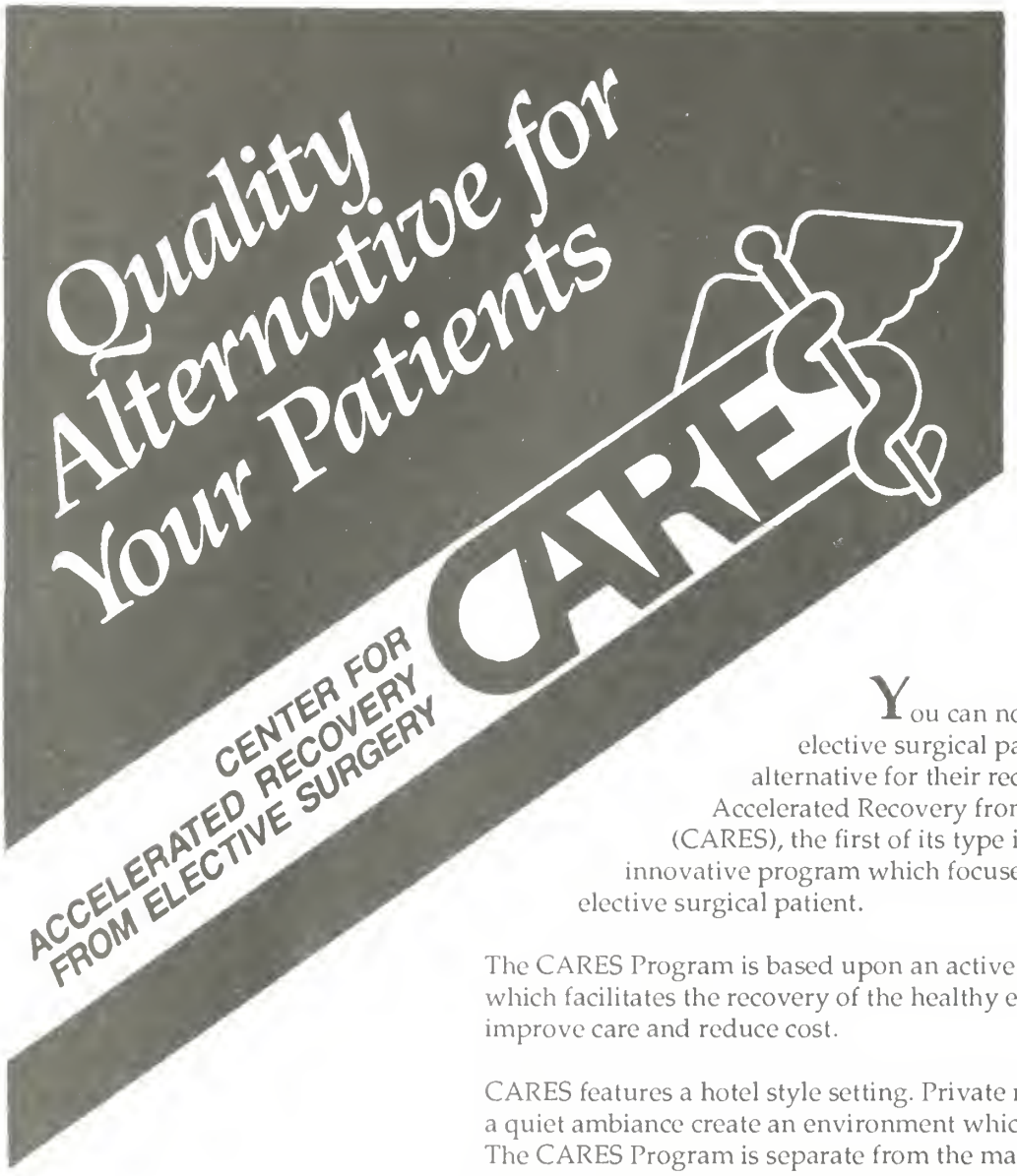


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# For the Benefit of the Sick: Lessons from the Travelers Aid Medical Van

L. McTyeire Johnston, MD

***The major failure of the health system is untreated patients, not untreatable diseases.***

*"I will come for the benefit of the sick, remaining free of all intentional injustice."*
(The Oath of Hippocrates)

The past decade has witnessed major advances in health promotion and maintenance: routine mammography is changing the face of breast cancer, hypertension treatment continues to lower the incidence of stroke, cholesterol awareness promises to have a similar impact on coronary disease, and the age of 2, not school entry, is now recognized as the optimal immunization target. In glaring contrast, increasing poverty and increasing costs of medical services have created an ever-growing population of underserved patients. These patients not only are denied comprehensive screening services but also are subjected, by all measurements, to a disproportionate burden of health risk and medical illness. Tragically, the major failure of the health system is untreated patients, not untreatable diseases.

Volunteer services have been one response to the problem of decreased access to care. In 1987, the Travelers Aid Society of Rhode Island instituted its Medical Van Project. Staffed entirely by volunteers, the van's initial purpose was to provide outreach, care, and referral for Rhode Island's population of homeless. Although there have been some changes in the volunteer roster and in sites visited, the van remains a major health resource and advocate for populations with no access to health care. Currently, a volunteer force of about 80 nurses and physicians supports van visits 5 nights weekly at sites varying from homeless shelters, to domestic violence shelters, to the streets. The van averages more than 200 patient encounters in each month of 80 hours of service.

*L. McTyeire Johnston, MD, is chairperson, Medical Advisory Committee, Travelers Aid Medical Van, and Clinical Assistant Professor of Medicine, Brown University School of Medicine, Providence, RI.*

***Volunteers on the Medical Van face the most challenging of medical problems, and fulfill the medical profession's commitment for service to those in need.***

Travelers Aid's philosophy of providing comprehensive services (educational equivalency programs, social service and entitlement assistance, job resource efforts) is directly applicable to medical efforts for homeless and underserved populations. The medical concept of "patient compliance" must account for access to care, and for survival needs: Where can patients rest and recover if shelters are open only for overnight hours? Where can pill bottles (or insulin syringes) be safe for those sleeping on the streets? What good is the proper prescription when the patient cannot afford the medication? What is the expectation of successful management of chronic conditions when the system cannot provide consistent physicians for the uninsured and poor?

These problems present a tremendous challenge: how to permit perhaps 20% of the population to share in the advances of health promotion and maintenance. Volunteers on the medical van face the most challenging of medical problems and fulfill the medical profession's commitment for service to those in need.

**Five Lessons**

• Alberto C. is a 36-year-old Central American gentleman brought to the van one night by his family. Through a family member, it was learned that he had been icteric for about 1 week, with anorexia but no vomiting; a fever of 101° had prompted the family's search for care. He had drank steadily for years but none in the past week, and had had "hepatitis" years ago. His examination was remarkable for his fever, icterus, stigmata of chronic liver disease, and ascites. After some debate, he agreed to referral for hospitalization, where bacterial peritonitis and infectious hepatitis were excluded, and his alcoholism was addressed. The patient has been compliant with follow-up visits, weekly for the first several months, and he now remains sober 12 months after presentation.

*This, of course, sounds like a too-good-to-be-true story. Yet it is true in every detail and attests to the successes possible when medical care is accessible and consistent follow-up is provided.*

• Jessica is a 10-month-old child seen at one of the domestic violence shelters with her mother, Joanna. Jessica was brought to be checked because she was cranky, and had recently been treated by a pediatrics clinic for bronchitis. In fact, the child was much improved on medication, but a cranky child sleeping in a single room with three other families was quite a stress; when the other children caught the same virus the stresses were worse.

*Homeless families, typically a mother with one or two children, are the most rapidly growing segment of the homeless population, accounting now for about 40% of homeless persons. In addition to the risks of congregate living, homeless children face obstacles in obtaining prompt care for routine and chronic conditions, rarely benefit from seeing the same pediatrician or practitioner, and are at high risk for problems in growth, development, and education.*

*A sheltered Rhode Island child died several years ago of bacterial meningitis. While her hospital care was of high quality, one can only speculate on the delays and obstacles to her initial assessment.*

• Joanna's story was more disturbing. She had recently been told to leave another shelter (where she and Jessica had their own room) because her abusive boyfriend had found out where she was. Her father had abandoned her and told her she "got what she deserved;" she couldn't tell her mother her whereabouts for fear the former boyfriend would coerce or intimidate the mother into divulging her hiding place. Joanna was waiting on her court date, trusting that a restraining order would be granted and be effective.

*Forty-five percent of homeless parents have histories of abusive spouses or mates; Annually, 3 to 4 million women are victims of domestic violence. Although domestic violence may account for as many as 30% of women's emergency room visits, providers identify domestic violence in less than 5% of cases.*

*Travelers Aid Mobile Medical Van on Dexter Street with St. Charles Church in background.* (Photo courtesy of *The Providence Journal-Bulletin*)

*Forty-three percent of homeless mothers name no one or only one person as a resource in times of stress; 25% name their child(ren) as their primary emotional support.*

• Bob W. is a 26-year-old redhaired man seen at the Salvation Army for a cold. He revealed that he had severed all family ties and that he was there with an alcohol problem that led to a discharge from the Armed Forces. During the interview he manifested pressured speech and thoughts although he was quite entertaining in recounting aspects of his history. After further questioning it became clear that he had an affective disorder and was probably bipolar. A long discussion followed in hopes of enabling him to negotiate the referral path into the community mental health facility.

*Alcoholism commonly coexists with and/or masks psychiatric disorders, as was clearly the case here. This patient had a psychiatric disorder generally responsive to treatment. Whether he received psychiatric evaluation and follow-up is not known.*

• "I have been out of this treatment center for 2 months now. And it's been an uphill battle ever since . . . When I was high I couldn't feel feelings, but now I'm not high, and I do feel feelings. Sometimes, I hurt. Some things, I don't understand, but no matter how it feels, I don't get high over it . . . But, I don't have the headaches anymore. I don't have the shakes anymore, and I don't look over my shoulder anymore."

*Treatment programs are accessible to only a minority of patients. The House of Representatives Select Committee on Narcotics Abuse and Control reported that 12% of the 3 million people in need of treatment actually received it.*

**So Why Volunteer?**

There are several reasons motivating physicians to volunteer: the professional obligation of service to the sick, the commitment that all patients deserve access to health services, and the rampant medical problems affecting impoverished populations.

Volunteer service to homeless and impoverished populations is, in a sense, continuing education, exposing physicians to problems uncommonly identified in private offices – domestic violence, unsafe sexual practices and the imminent epidemic of heterosexual AIDS, and tuberculosis in all its forms,

from quiescent infection to active disease. Furthermore, the incidence of better-known medical problems – hypertension, cigarette-associated lung disease, abnormal pap smears – is highest in those populations lease served, demonstrating the cruel irony of "reverse targeting" of health services. The population served by the Travelers Aid Medical Van offers the greatest obstacles to health promotion and disease prevention, the greatest burden of active illness, and the greatest challenges to successful care.

Clearly, populations in need are expanding. Nearly 20% of Americans have no health insurance; many others (perhaps 35%) have such limited coverage that health maintenance assessments and today's standard medications are financially out of reach. Poverty appears to be a growth industry, now with nearly 15% of Americans (and 25% of children!) living below the poverty line. Rationing of health care has been here for a long time, with the sickest having least access to and comprehensive service by the medical system.

Thankfully, the responsibility of physicians remains to patients, not to systems. The complexity of health economics and social problems should not overshadow physician alarm at the growth of populations unserved by basic health promotion and timely medical treatment.

### A Challenge and A Prayer

Some physicians serve on the medical van or in other volunteer sites. Others accept cases in need into their practices, or offer other services to patients not embraced by the health care system. There is real illness to be discovered, and real healing to be accomplished in those populations of homeless, uninsured, underinsured and impoverished patients left outside the health care system. Volunteer medical activities face a wealth of patients and problems to serve.

> "Do not allow thirst for profit, (or) ambition for renown and admirations, to interfere with my profession, for these are the enemies of truth and of love for mankind and they can lead astray in the great task of attending to the welfare of Thy creatures. Preserve the strength of my body and of my soul that they ever be ready cheerfully to help and support rich and poor, good and bad, enemy as well as friend. In the sufferer let me see only the human being."
>
> *(The Prayer of Moses Maimonides)*

*References available on request.*

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# Orbis International: A Chance to Give

Arthur I. Geltzer, MD

***I know of no other charitable medical program like Project Orbis which continually circles the globe and which has carried out more than 100 training programs in the last 8 years.***

Of all my professional teaching experience, none has been so dramatic, exciting, beneficial and refreshing as Orbis International.

In the rear cabin of a DC-8, redesigned into one of the best operating rooms I have ever been in, I am performing vitreoretinal surgery on a Burmese peasant. Cameras project the surgery to what had been the business class compartment where about 20 Burmese ophthalmologists, fascinated by the procedure, watch and take notes.

They ask questions, and I respond via microphone and translator. After 2 to 3 weeks of watching and asking questions, the doctors will return to their towns, better able to improve their communities' health.

During the visit, two other doctors and I, chosen from Orbis International's volunteer faculty of 350 ophthalmologists, both teach and learn.

We teach a procedure, while the full-time Orbis nurses teach equipment preparation and handling, and Orbis engineers teach the equipment's maintenance.

We learn more about medicine. First, in screening patients for surgery, we see and remember problems rarely encountered in relatively healthy US, Canadian or British practices. Second, we work in the context of foreign medical techniques, an unusual situation.

*Being greeted by the Mali health minister.*

I remember how, in Beijing, an elderly Chinese doctor demonstrated his method of removing cataracts under acupuncture anesthesia, using a silicone marble to remove the cataract. On the following mission to Burma, a prominent American cataract surgeon, excitedly watching a tape of the procedure, decided to attempt it with some minor variations, such as sterilizing the silicone marble. While he was in surgery, I was paged because of an emergency. The cataract had fallen into the vitreous cavity. I scrubbed in and removed the cataract by vitreous surgery. We reviewed the tape again, and he tried again, and the cataract again fell into the vitreous cavity. I again removed it.

It was then that I realized that the silicone marble picks up the cataract because silicone is hydrophilic and the cataract is water dense, but when the silicone is sterilized, it absorbs enough sterile solution so that it loses most of its hydrophilia. It will no longer hold the cataract.

Although the attempt was unsuccessful, it was definitely worthwhile, because it would have enabled ophthalmologists without much equipment to perform sterile cataract surgery. It was also a very worthwhile learning experience.

In Orbis International we learn continually about other peoples. We

*Arthur I. Geltzer, MD, of Ophthalmology Inc., Providence, RI, is Assistant Clinical Professor of Surgery (Ophthalmology) at Brown University School of Medicine and a retinal vitreous surgeon at Rhode Island and Miriam Hospitals, Providence, RI.*

*A converted business class classroom, with host doctors watching and commenting on surgery.*

see the doctors' homes, dine with them at their restaurants, and even meet the highest public officials – prime ministers, health ministers, and heads of state – who take pride (and credit) in bringing improvement to their countries' health. These powerful political leaders frequently can allocate monumental increase to the local health care budgets.

And publicity raises the public's consciousness of eyecare and blindness. Thus an Orbis visit is, as an understatement, better than a guided tour and more charitable than treating a single patient.

**Delicate Procedures**

The delicate intricacies of the Orbis procedure are as much diplomatic as surgical. Is the doctor who invited us the doctor best able to learn the surgery? In another culture how do you teach without offending and how do you maintain composure when you find you must simultaneously teach the basics to one doctor while another is quickly absorbing the details of technologically advanced vitreoretinal surgery?

(In Nairobi I was brought a thin, hungry child from Somalia who had been bitten by a hyena. She was thought to have lost both of her eyes 10 days earlier. Asked to perform an "American Miracle," I complied. One eye was lost but I gave her sight in the other by removing a large suture that had closed it in the field hospital.)

And how, exactly, do you address GEN Muhammad Zia, head of the Pakistani government, when he appears at the operating table? (It was hard to ask for vitreous forceps with your assistant bowing to the floor.)

**The Basics of Orbis International**

The basic mechanics of Orbis International, after 10 years of operation, are well-organized. With five ophthalmologists, a dozen nurses, public health experts and lead people on staff, logistic arrangements are made in advance, at the invitation of the host country's ministry of health and its national ophthalmological society. Orbis teams are on-site before the Orbis plane arrives, and strategic responsibility of the ophthalmologist volunteers is simply to appear at the airport on time. The volunteer usually donates his or her time, expertise and airfare.

My partner, Jeffrey Hofmann, MD, has also become interested in the project. We each spend 2 weeks a year away from the office. I have been to Pakistan, Sri Lanka, Senegal, Mali, Kenya, Bulgaria, Colombia and Burma. Jeff has taught and performed plastic ocular surgery in Bangladesh, Mongolia, Nicaragua and Ecuador.

I know of no other charitable medical program like Orbis International, which continually circles the globe and which has carried out more than 130 training programs in the last 10 years.

It is unlike Project Hope, with which it is often confused, because it does not stay months in a place to treat patients, but stays weeks to train physicians and generate greater interest in health care.

The project is funded by donations, in part from ophthalmologists and other physicians, corporations, foundations, and governments, and in part by the US Agency for International Development. Credit must be given to David Paton, MD, the Texas ophthalmologist who originated the idea in the 1970s. Together with A.L. Ueltschi, president and CEO of Flight Safety International, they convinced United Airlines to donate a plane and participate.

Orbis International has been a wonderful experience for me. It is a break in my routine, a shock to my system, a reminder of health problems I rarely encounter, and an opportunity to improve health care in societies less fortunate than our own.

*Address correspondence to:*
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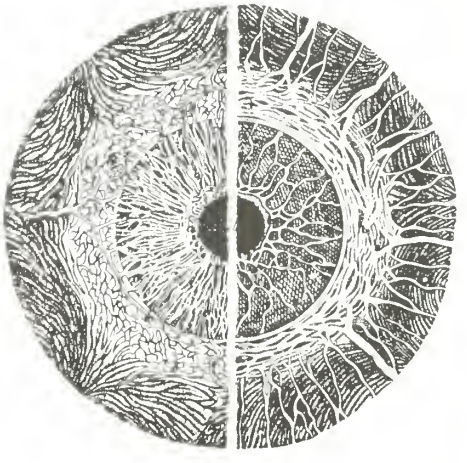

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# Amos House:
# A Place for the Homeless and Hungry

Edward W. Martin, MD

***Fundamental changes that open up our health care system to all Americans are needed.***

*. . . and they shall rebuild the ruined cities and inhabit them;*
*they shall plant vineyards and shall drink their wine,*
*and they shall make gardens and eat their fruit.*
(Amos 9:14)

Amos House is a private, non-profit, non-denominational organization in South Providence that provides breakfast and lunch for about 450 people each day and also functions as a temporary shelter for homeless men and women. The House was founded in 1976 by Sr Eileen Murphy, RSM, and named after the Old Testament prophet.

In 1985 the Amos House Medical Clinic was started with a small staff of volunteer physicians, nurses and other health-care personnel. Initially, patients were seen in the business office, a less than ideal setting. The primary function of the clinic, then, was to assist a social worker from the Department of Human Services in evaluating homeless, alcoholic patients and to aid them in entering appropriate treatment. In 1988 the women's shelter was opened and space was set aside for a small medical examination room, which soon evolved into a well-equipped medical facility.

*Edward W. Martin, MD, is an internist at Roger Williams Medical Center, medical director of Hospice Care of Rhode Island, physician to Amos House, and Clinical Assistant Professor of Medicine, Brown University School of Medicine, Providence, RI.*

*Amos House. 415 Friendship St., Providence, RI 02907. (401) 272-0220*

*The Women's Shelter of Amos House, location of the medical clinic.*

Most of the medical problems I see fall into several categories: alcoholism and chemical dependency, respiratory illness, emergency room follow-up, pre-employment physicals, and employee health.

**Alcoholism and Chemical Dependency:** For years, the clinic has been used by drug and alcohol programs in Providence to provide initial medical evaluation and to complete paperwork necessary for public assistance. It became clear that in many of the programs, follow-up was not adequate, considering the severity of the illness. I was merely helping to provide a source of income to purchase drugs and alcohol. I now work only with the Salvation Army program which requires daily attendance and stays in close contact with the case workers at the Department of Human Services. Any problems in compliance with treatment of the initial assessment are probably reported. Frequently, at the time of the initial assessment, the patient is not sufficiently stabilized for an outpatient program and therefore must be referred for inpatient treatment at the state facility, Benjamin Rush Building, RI Medical Center. My exam is to assure that the patient is 1) sober and ready to enter an outpatient program; and 2) medically stable and not in acute withdrawal.

**Respiratory Illness:** During the winter months, we see patients with respiratory infection. I keep a good supply of antibiotics and over-the-counter cough and cold preparations, the drugs we use most.

**Hospital and Emergency Room Follow-Up:** Lack of insurance often prevents the patients from returning to the hospital or another facility for follow-up care. In addition to suture removal, dressing changes, and medication adjustment, I arrange appropriate specialty follow-up when needed.

**Pre-Employment Physical Examinations:** This is one of my most gratifying activities in the clinic. Many employers require an examination by a licensed physician prior to employment, and this is a significant obstacle for someone who has been unemployed and uninsured. Providing the medical exam helps facilitate the return to the workforce.

***The staff at Amos House are committed to finding solutions to the problems that create a need for their services, understanding that shelters are not the answer to homelessness nor soup kitchens the answer to hunger.***

**Employee Health:** I dealt with this in a systematic way when we were notified that one of the shelter residents had been diagnosed with active tuberculosis. All of the staff were skin-tested, which has since been repeated following another reported exposure. Of the almost 20 individuals tested, none were tuberculin-positive.

The clinic is least equipped to provide primary care. I see our main role as trying to get people into the present system (ie, neighborhood health centers). Patients who can get to my office are now seen there.

The staff at Amos House is the main reason I go back week after week. While I'm there briefly on Thursday, they are there daily and manage to maintain a spirit of caring. They are committed to finding solutions to the problems that create a need for their services, understanding that shelters are not the answer to homelessness nor soup kitchens the answer to hunger.

Along these lines, it is clear that volunteer medical clinics, while serving an important role, cannot provide for the comprehensive and ongoing health care needs of the homeless and uninsured. Fundamental changes that open up our health care system to all Americans are needed.

*Address correspondence to:*
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# Physicians for Peace: Making a Difference in the West Bank

Jack R. Bevivino, MD, FACS

***Physicians for Peace works through medicine in zones of conflict, in collaboration with the host country physicians, joined by colleagues from neighboring countries, and always without political involvement.***

The idea of a trip to the Middle East started back in October 1989 while I was attending the national meeting of the American Society of Plastic and Reconstructive Surgeons. I was having dinner with my good friend Eid Mustafa (who had been my Junior Resident in Plastic Surgery at Rhode Island Hospital) when we started discussing the health care situation in the land that he called Palestine. Eid is by birth a Palestinian, and over the years I had come to learn a great deal about the history of the Holy Land. I had heard Eid on many occasions talk about the land his parents owned in Palestine, land that has now been occupied by the Israelis for many years. Few of us can really have a true understanding of what it means to live in an occupied country but Eid has brought a great deal to my attention over the years.

In any event, Eid had previously been on a mission to Palestine with an organization known as Physicians for Peace. This organization was founded by Charles Horton, MD, who is well-known as one of the notable contributors in plastic surgery. Through his untiring efforts, Physicians for Peace has become an internationally respected organization.

*(From left) Eid Mustafa, MD, Martin Carney, MD, and Jack Bevivino, MD, during April, 1992 mission to the West Bank.*

Physicians for Peace was founded to promote international friendships through medicine. It works to advance the cause of peace in areas of tension through medical good works, by educating physicians and other health care professionals, by serving the needy and restoring human dignity, by exchanging medical skills, and by bringing together national antagonists. Physicians for Peace works through medicine in zones of conflict in collaboration with the host country physicians, joined by colleagues from neighboring countries, and always without political involvement. Much of the work has been centered in the Middle East, and my specific involvement has been in the West Bank and Gaza Strip.

My first experience came in February 1990. As part of an 18-member team our goal was to evaluate the health care system of the Palestinian people and make appropriate recommendations on how health services

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could be improved. I was part of a three-man plastic surgery team which visited such cities as Ramallah, Nablus, Jerusalem, and Gaza. I met frequently with leaders of the medical community who were involved in the treatment of patients with plastic surgical problems. I gave several lectures and provided surgical treatment. Our goal was not to go into their hospitals, operate on their patients, and then leave. Rather, we felt the obligation to help as much as we could so that local surgeons would be able to manage their patients better. I believe this is what makes Physicians for Peace different from many other organizations in that the goal is to educate the local physicians who will in turn be able to care for their patients.

I returned to Palestine in April 1991. Unfortunately, a trip in 1990 had been canceled because of the Middle East war. However, my second trip was even more rewarding, and my welcome even more enthusiastic. Patients waited for hours to see the plastic surgical team, and each of the 43 surgical procedures performed during the 2 weeks added to the knowledge and experience of the hospital staffs. Surgical cases included the repair of congenital facial deformities such as cleft lip and cleft palate, correction burn scar contractures, post-traumatic facial deformities and the reconstruction of congenital and traumatic hand deformities. One of the most difficult decisions to make was which patients were suitable candidates for surgery. Certainly most of them were, but many had surgical problems requiring more extensive preoperative preparations (ie, orthognathic surgery) or post-operative care and follow-up. It was difficult to realize that many of these patients, especially children, would have to go without the surgery that could make a real difference in their lives.

Unfortunately, I had come to know that despite the skill and enthusiasm of the health personnel, they were severely restricted in their ability to render quality medical care. The Palestinian people in the occupied territories did not have access to the same medical care as people in Israel proper. This included all aspects of medical care from the facility itself to the equipment and supplies available. I found myself lacking many of the basic materials that I have taken for granted here in the United States. It became apparent that politics was intimately intertwined with health care in the occupied territories.

At the present time there is only one fully trained plastic surgeon in the occupied territories where 1.5 million Palestinians live. It is virtually impossible for him to handle all the needs of this vast community where the need for reconstructive surgery is extensive.

Physicians for Peace is also active in assisting foreign physicians in their endeavor to receive additional education in the United States. At the present time we are instituting a program in maxillofacial reconstruction and will have our first fellow at Rhode Island Hospital in January 1994. This pilot program will be sponsored by the Department of Plastic Surgery along with assistance from the Orthodontic and Oral Surgery Departments at Rhode Island Hospital. It is anticipated that this training will be of significant value to the Palestinian community.

By the time this is in print I will have returned from my third trip to Palestine. I have no doubt that my experience will be equally as rewarding.

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# Chad Brown Health Center and Physician Volunteering

Linda Pololi, MB, MRCP

***The assumption that personal behavior is mostly subject to individual choice is erroneous for those whose environment does not allow the ability, nor afford the opportunity, for the adoption of healthy lifestyles.***

I have had the privilege over the last 3 years to spend some time at the Chad Brown Health Center. This experience has affected me considerably in both my professional and personal thinking by opening for me a small window on a part of America to which I had not been previously directly exposed. It has increased my understanding of difficult medico-social problems beyond simplistic stereotypes. But before I comment on the impact working there has had on me, I ought to describe this small health center and what makes it so distinctive.

Each year, more than 60,000 people in Rhode Island seek medical care not at the offices of primary care physicians, nor in the efficient but overcrowded and impersonal emergency rooms of local hospitals but at the 14 independent health centers. These health centers thus constitute a principal – and for many the only – source of primary care for poor patients in the state. The fees charged for services provided are based on a sliding scale, determined in turn by the patient's income and family size. No one is denied service because of an inability to pay.

*Linda Pololi, MB, MRCP is a member of the Division of General Internal Medicine, Memorial Hospital of RI, Pawtucket, RI and Clinical Assistant Professor of Medicine at Brown University School of Medicine.*

Chad Brown is the smallest health center in Rhode Island and is situated in the Chad Brown Housing Project, between Douglas Avenue and Admiral Street, in Providence. It was established in 1969 by four concerned physicians: Drs G. Coleman, J. Coughlin, H. Robidoux and P. Russo, who recognized the urgent need for the provision of primary care services to the residents of this Providence neighborhood. Since 1974, Nurse Mary O'Regan has been the executive director of the health center, and she has meted out compassion and sustenance to patients and staff alike. Together with nurse practitioner Dianne Pacheco, the nursing staff has been the backbone and the principal providers of health care at Chad Brown. On her retirement last summer, Mary O'Regan left a profound and valuable legacy of service and goodwill within this community. The center is now staffed by two nurse practitioners (Dianne Pacheco, executive director, and Nancy Carlson), a nutritionist, and a receptionist.

Chad Brown Housing Project is home to 194 families, 93% of whom are headed by a female. The health center's patients are representative of the Chad Brown community with 70% being African-American, 12% Hispanic, 12% white and 6% Native-American. The patient population is strikingly young, with only 7% aged 45 to 64 years and a mere 1% older than 65 years.

Only about 30% of heads of household are employed. Sixty-five percent are at or below the poverty income level (currently set by the government at $6,810 a year for an individual and at $13,950 a year for a family of four). The average income per household is $9,306 a year. Fourteen percent of the patients visiting the center have some health insurance, 65% are on welfare and 21% have no health coverage whatsoever. Since all patients are poor, the health center would not be able to function without counting on the help of a number of volunteer physicians.

The center's total annual budget is about $130,000 and depends heavily on grants from the state Department of Health and also from the DHS, PPS and WIC programs. Grant requests constantly have to be written to finance even the minimum functioning requirements of the center.

Last year, about 1000 patients sought medical advice and care at the health center. There were more than 4300 patient visits, of which approximately two-thirds were

***ABBREVIATIONS USED***

***DHS: Department of Health and Human Services***
***PPS: Pediatric Preventive Services***
***WIC: Women, Infants and Children program***

attended to by the nurses. About a third of the visits were for reasons related to obstetrics and gynecology and about half were by children. Two surgeons, one pediatrician, one obstetrician and an internist spend about 8 hours a week in total at Chad Brown, almost all of them on a voluntary basis. Last year, the physicians' efforts covered 1350 visits, of which 400 were by adult patients.

The patients I care for most commonly have hypertension, diabetes or asthma, but these are often the least of their many and overwhelming problems. I realize that in my capacity as physician at Chad Brown, I am able to influence but a very small part of the woes oppressing these patients. It has been stated that in the United States about 50% of premature mortality can be attributed to lifestyle, 20% to human biology, 20% to environment and 10% to health care.[1] The assumption that personal behavior is mostly subject to individual choice is erroneous for those whose environment does not allow the ability, nor afford the opportunity, for the adoption of healthy lifestyles.[2] I am reminded of Mitchell's poem,

> "if you
> have decent air to breathe,
> live in a low-crime neighborhood,
> have a meaningful job with adequate pay,
> work in a safe environment,
> have money to choose good food and time to enjoy preparing it,
> can afford to take vacations,
> have a safe place for your children to play,
> enjoy life and look forward to the future;
> then (maybe) you can choose health."[3]

A large part of my responsibilities at Memorial Hospital of Rhode Island is to teach preventive medicine to internal medicine residents and medical students. I have tried to integrate this personal interest into Chad Brown where there is indeed fertile ground for practicing prevention. I hoped that helping them change their personal health habits would be more useful to these patients in the long run, than gaining access to expensive technology and treatments. To accomplish this, I often seek ways to motivate and empower them to help foster self-reliance and optimism. Only then might these patients be able to make tough decisions and take the necessary steps to change their lifestyle.

*Brown University medical students (Affinity Group) in front of the Chad Brown Health Center office.*

***Two surgeons, one pediatrician, one obstetrician and an internist spend about eight hours a week in total at Chad Brown, almost all of them on a voluntary basis.***

Chad Brown is a perfect location for studying the biopsychosocial model.[4] One can hope to practice effective preventive medicine only after understanding the psychological and sociological aspects of the patient's life and then incorporating these essential elements into an assessment of the patient's problems. Only such an understanding can result in a plan that not only promotes successful behavioral change but more importantly is recognized as appropriate by the patient. I find the patients at Chad Brown very receptive to the philosophy of preventive medicine, and they indeed make great efforts to adhere to our negotiated goals. Nonetheless, any recommendations and plans are constantly and severely tempered by financial limitations.

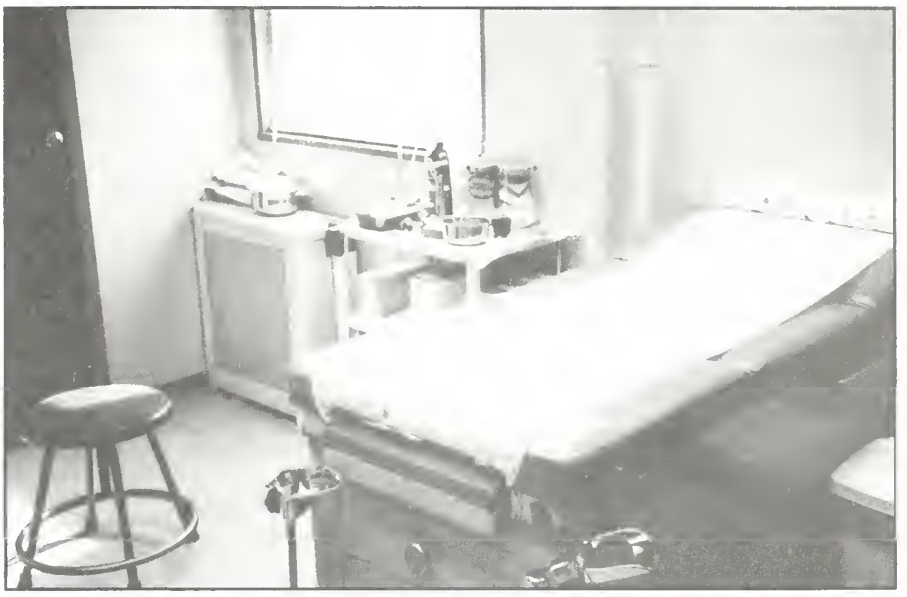
Together with my colleague, James Alves, MSW, RISW, director of Outpatient Services at Butler Hospital, and 10 Brown University School of Medicine medical students, we have formed an affinity group that has been meeting for the past 2 years to discuss issues of preventive medicine, race, gender and communication skills. Chad Brown Health Center is providing us with an ideal setting for practicing our classroom knowledge and improving newly learned skills. Our students have enthusiastically developed a project that will include surveying the Chad Brown Community for an assessment of the residents' self-perceived needs and subsequently developing and providing appropriate preventive medicine interventions. The project exemplifies the principles of patient education and empowerment intrinsic to the practice of successful preventive medicine.

Taking part in a center such as Chad Brown allows one just a teaspoonful

of self-satisfaction – to know that at least locally, in some very small way, one is able to contribute to meaningful change in our vast, unwieldy system. The nurses, and to a lesser extent the physicians, are the epitome of Rene Dubos' useful maxim: "think globally, act locally." The power of a "grassroots" level of interaction and intervention is evident at Chad Brown. As physicians hand out advice and medicine, the nurses are handing out food and clothing. The patients feel comfortable at this health center within their neighborhood. They prefer not to go to a hospital, feeling that they know the center and that they themselves are known and understood. They trust the center's permanent staff and can be quite frank in this environment. Families are followed from generation to generation and records of all family members are kept in the same folder. Even after some families move out of the community, they tend to keep coming back to the center. In addition, the atmosphere at Chad Brown has a lightness of spirit, a camaraderie and an absence of any cultural or social barriers.

No amount of scientific reading or erudite discussion can substitute for listening to the "stories" of these patients. I find that most of these patients have never had the opportunity to spend time in conversation with a physician, to actually describe their lives or problems. I repeatedly find them surprised at my interest. I hear the stories of this group of people and I am able, however briefly, to become part of this Other America from which many of us live apart. The experience is humbling and has compelled me to reassess myself and my priorities, our country and its social make-up, and, most pointedly, our inadequate systems of health care and education.

If you would like to consider a similar opportunity, please call Barbara Ford, head of Research and Recruitment for the Rhode Island Health Center Association, 732-3778.



*Chad Brown physician's office.*

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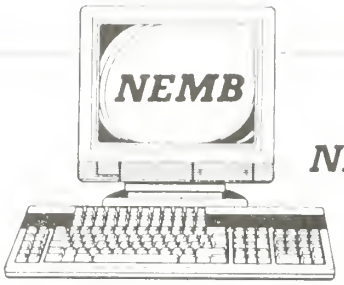


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# Volunteerism in the Naval Reserve: A 15-year Perspective

CPT James P. Crowley, MC, USNR

***My career in the Naval Reserve has been most satisfying to me. I have assisted in the training of many nurses and corpsmen in combat care. That training paid off when they were sent into battle.***

Following my internship and residency at Boston City Hospital, I served 3 years on active duty in the US Navy from 1971 to 1974. After I finished my tour of duty, I resumed training in medicine and hematology. I returned to Providence in 1976. Since then I have been a faculty member in the Department of Medicine at Rhode Island Hospital and Brown University.

In 1977, I was contacted by a recruiter from the Naval Reserve Readiness Command in Newport. They needed Navy doctors badly. Following the Vietnam period, physician recruitment had fallen off drastically. They wanted to know if I would be interested in serving as Lt. Commander in the Reserve Unit in Worcester. I was busy at that point, but I had enjoyed my time in Naval service. It had been a real opportunity to serve in challenging leadership roles. I had enjoyed working with other Navy doctors from around the country, and I had made many friends. Because of these positive experiences, I decided to resume my Naval career as a reservist. Although I have never regretted the decision, the recent call-up of physician reservists in 1990 and 1991 for service in the Persian Gulf certainly caused me to reflect on the sacrifice that is imposed on family and patients when physicians are called to active duty.

From 1977 to 1981, I was assigned the Medical Mobilization Unit (MOMED) in Worcester, Massachusetts. My unit's assignment was to train nurses and corpsmen for combat duty. At that time the principal threat to US security was thought to be the now defunct USSR. The Navy's medical role was seen as support to the fleet in cold weather stations. In those days we took our units to the White Mountains in New Hampshire. We lectured them by day on cold problems and then often treated them by night for the same problems we supposedly trained them to avoid!

After 1981 the Naval Reserve became much more serious about its training. During the Reagan years we began to be integrated more closely with active duty medical units. By 1983 our mobilization unit was assigned directly to reserve units of the US Marine Corps. We stopped drilling in the White Mountains and were assigned to more realistic Marine-oriented training at Camp LeJeune, North Carolina. Our cold weather training was in Army camps in Wisconsin and Minnesota. The degree of cold injuries of Marine reservists increased with this training, and serious problems were encountered, particularly in Marines from the South and Southwest. More realistic training was required.

In 1985 I was promoted to captain and assisted as battalion surgeon to the 1/25 company of 4th Marine Division. We were airlifted 150 miles north of the Arctic Circle to Norway in March for a huge NATO exercise that lasted several weeks and was meant to impress the Soviets. This was the ultimate in cold weather training. I personally suffered an asthma attack when the temperatures dipped below -28°F, which I had never experienced before or since. We also had a serious fire caused by an overturned tent stove in a hospital tent filled with exhausted Marines. I am glad to say the prompt action we took to remove the men from danger, and the flame retardant spray on all the bedding resulted in injuries no more serious than a few singed eyebrows.

From 1987 onward I was assigned to the Fleet Hospital 7. With the decline and eventual dissolution of the Soviet Union and the Warsaw Pact, it seemed increasingly unlikely a need

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***ABBREVIATIONS USED***

***MOMED: Medical Mobilization Unit***
***NATO: North Atlantic Treaty Organization***

would develop for Naval reservists to serve in cold weather climates. The rising threat of radical Arab dictators in 1989 provoked a change in training conditions to warmer climates. Our training sites shifted to Texas, in particular to Camp Bullis outside of San Antonio, Texas, and to Camp Pendleton, the giant Marine base between Los Angeles and San Diego. Increasingly, emphasis was placed on medical complications of hyperthemia and dehydration. Exotic problems such as treatment of rattlesnake and scorpion bites were interesting subjects to learn about, but we didn't take them too seriously. One night at Camp Bullis after a particularly rainy day, the finding of a scorpion under my own sleeping bag changed my perspective on the potential seriousness of these pests.

In August 1990, Saddam Hussein invaded Kuwait. The Naval Reserve was immediately put on alert for mobilization. Fleet Hospital 7 was notified to expect mobilization since we were familiar with problems associated with battle injury in warmer climates and deserts. In September 1990, I was ordered to attend the Combat Casualty Care course at Fort Sam Houston in Dallas. This was rigorous training involving all details of forward casualty management, from the proper techniques of litter bearing, to the placement of the casualty receiving tent. The pros and cons of covering the ambulance's red cross if we were to go to Kuwait in support of the Marines were discussed. We reviewed everything from carrying injured men across rivers and down steep slopes to connecting the field telephones properly. I learned how to rappel, which was scary at first but then exhilarating. All through the fall we had continuous phone calls, which was a way of keeping everyone ready to leave on a moment's notice. In December 1990 things seemed about to come to a head when we were called on to make out our wills, and were then issued additional camouflage uniforms. The 1/25 Marine Reserve Unit that we supported had been activated and was already in Saudi Arabia. In Rhode Island, Drs Joseph Pfeifer and Christopher J. Morin, fellow Naval Reservists, had been called up, as were several of my unit's nurses and corpsmen. I hoped the training they received would be adequate. We all prayed that they would come back uninjured.

At 12:50 a.m., January 16, 1991, President Bush ordered fighter planes into Kuwait, initiating a merciless bombing of the Iraqi forces. The allied land invasion began in the morning of Saturday, February 24, 1991. This war lasted only 100 hours. The Iraqi Army was totally crushed. That week, for the first time in several months, I slept without worrying if the phone would be ringing from the Reserve Center to announce my mobilization. I was proud that reservists called to the Gulf War served with distinction. Sadly, nearly an entire reserve medical unit from Pennsylvania was destroyed by a direct hit from a Scud missile. While I was relieved I wasn't called up, I felt a pang of guilt at getting off so easily when I heard the dreadful news that two physicians were among the fallen heroes.

My career in the Naval Reserve has been most satisfying. I have assisted in the training of many nurses and corpsmen in combat care. That training paid off when they were sent into battle. The Reserve Fleet Hospital treated more casualties than the regular Navy Fleet Hospital and was commended for its *esprit de corps* by the Chief of Naval Operations, as well as for their outstanding performance.

I am still serving in the Naval Reserve. Things are quiet for the moment, and for the first time in my entire Naval Reserve career the Navy has let me attend a medical meeting in lieu of field training. The lessons of the Gulf War for the reservists are still being digested. As we face the necessity to downsize the military in the next few years, the higher echelons of the Armed Services are debating about the proper mix of reservists and active duty personnel to maximize our defense and responsiveness to crises that threaten U.S. interests. A few would like to see the new Navy be entirely active duty while most others want a mix, depending on their perspective with a greater or a lesser reliance on reserve forces. Whatever the future fate of the Naval Reserve, I consider it a singular privilege to have been able to have served my country in this way.

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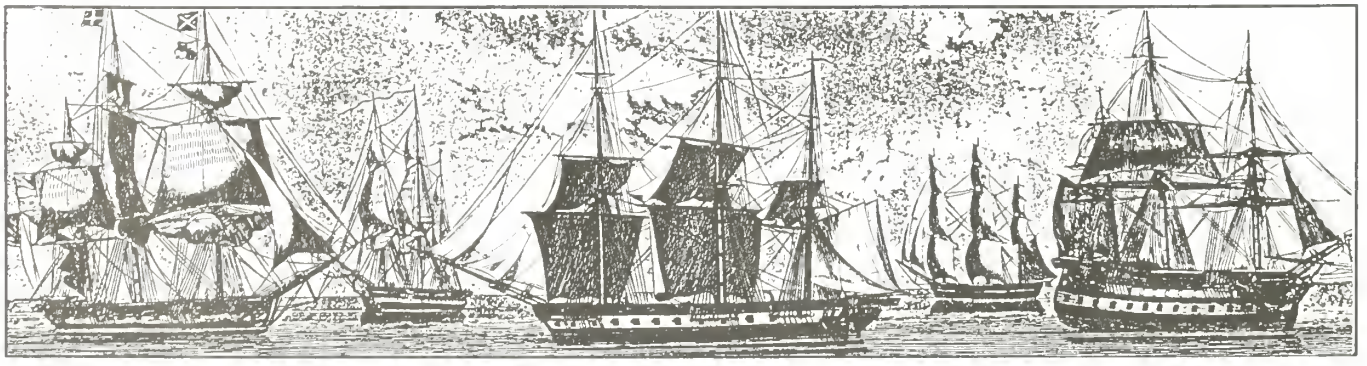

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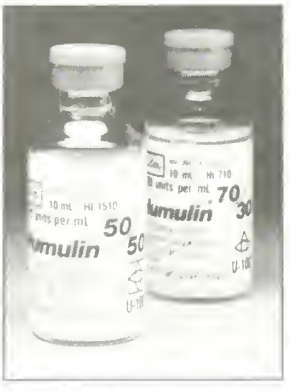


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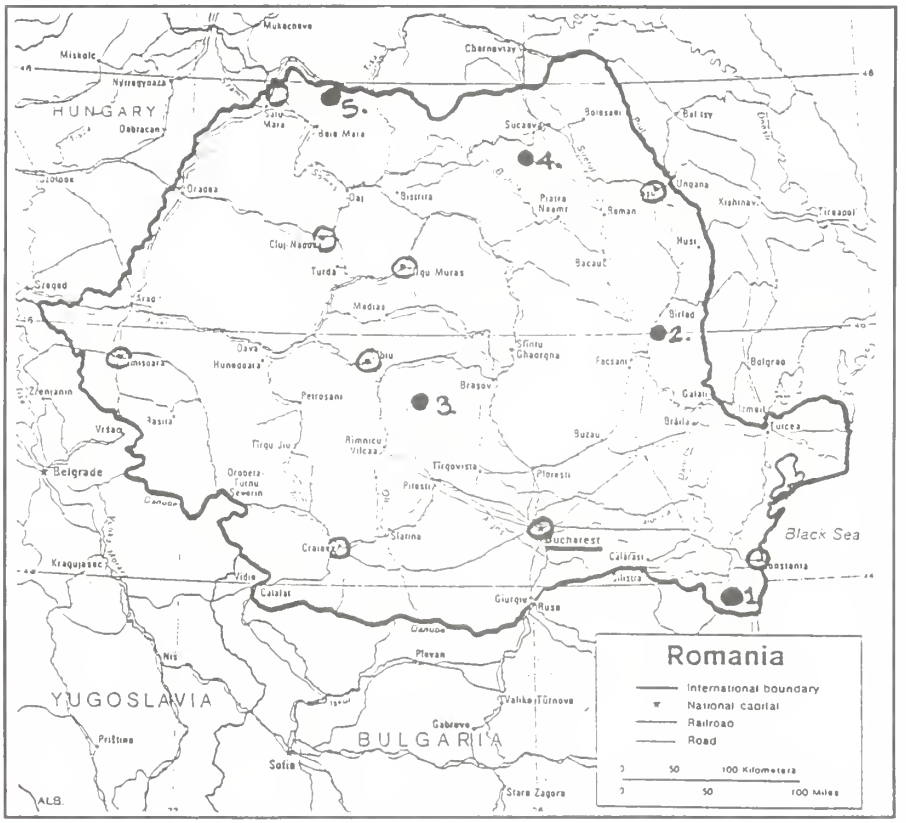
# Caring for the Romanian Orphans

Kevin Vigilante, MD, MPH

***The result of these pronatalist polices was to produce a surfeit of children who were unwanted. Many were put up for adoption or merely abandoned, and a state system of orphanages was created to care for the "excess" children.***

In 1966 Nicolai Ceaucescu, motivated by issues of economic productivity, embarked on a pro-natalist policy to reverse Romania's declining birthrate. In 1965 Romania had had the highest abortion rate in Eastern Europe. So, to achieve his goal, he not only made contraceptives unavailable but restricted abortions significantly. The only remaining method of birth control was illegal abortion. These measures had a transient effect in raising the birth rate, but by 1983 the rate was back to its former level. So in 1984 more draconian measures were introduced. Among them was a policy that required female employees to undergo regular gynecological exams for the purpose of identifying pregnancy. Those who were found to be pregnant were monitored closely until delivery, and all miscarriages were thoroughly investigated.

The result of these pro-natalist policies was to produce a surfeit of children who were unwanted. Many were put up for adoption or merely abandoned, and a state system of orphanages was created to care for the "excess" children. At the age of 3 all orphans were examined to determine which were fit to contribute to Ceaucescu's grand scheme and which were not. The "normal" children were sent to orphanages where they were reasonably well sheltered, fed, and educated. The "abnormal" children on the other hand were sent to orphanages for the "irrecoverably handicapped." Children with mild abnormalities such as learning disabilities, visual or hearing impairments, cleft palates or even those who merely resided in the lower percentiles for height and weight,




*A map of Romania indicating the cities visited by Dr. Vigilante and his colleagues, particularly (1) Negru-Voda Constanta; (2) Nicoresti-Galati; (3) Tigveni-Arges; (4) Sasca-Suceava; and (5) Sighetu Marmatiei.*

*Kevin Vigilante, MD, MPH, is a Clinical Assistant Professor of Medicine, Brown University School of Medicine, Providence, RI, and a Clinical Partner in Immunology Group, Miriam Hospital, Providence, RI.*

***ABBREVIATIONS USED***

***HIV: Human immunodeficiency virus***
***NGO: Non-governmental organization***

*Children in a Romanian orphanage.*

were condemned to these inhuman facilities.

Once incarcerated behind the barbed wire fences that often surrounded these institutions, these children faced a life of profound neglect, criminal abuse and premature death. These orphanages, which were frequently run by physician directors and were staffed by untrained aides, warehoused more than 100,000 children and were placed in the poorest and most remote parts of Romania. This network of institutions formed a Romanian Gulag Archipelago for children and is one of the greatest obscenities of the Romanian Communist regime.

After the revolution of December 1989, these crimes were brought to the attention of the international community. Scores of non-governmental organizations (NGOs) from many countries responded to the problem, and many new NGOs were created to respond. Governmental aid, particularly from the US, has been limited due in part to the suspicion that the present Romanian government merely represents a reshuffling of the former government and is not seriously committed to democratic and free market reform. The bulk of work, therefore, has been carried on by non-governmental and volunteer organizations.

In March 1991, Dr Jack Lawlor, a retired Providence urologist, traveled to Romania under the auspices of the Rhode Island Chapter of the Free Romania Foundation (soon to be renamed). He was accompanied by his wife Hope, a former nurse, and a Brown medical student named Esther Yang, as well as a number of lay volunteers. Dr Lawlor introduced me to the problems in Romania and to the work of the Free Romania Foundation. He told a disturbing tale of abuse and neglect resulting in malnutrition, severe illness, and profound developmental delay. He said the children in the orphanage at Sighett, where he was working, were housed in a facility so cold that some lost digits from frostbite and died of hypothermia inside the facility.

I departed for Romania in October 1991 with another member of the Rhode Island medical community, Judith Goble, a nurse anesthetist from Rhode Island Hospital. I was sent to Negru Voda, a small, poor farming village in southeast Romania near the Bulgarian border and the Black Sea, to support the efforts of a team of Irish and English lay volunteers. Ms. Goble was assigned to a different orphanage in the town of Nicoreste.

Shortly after my arrival in Negru Voda, a town in which telephones and running water are a luxury and an ox cart is more common than an automobile, I was given a tour of the orphanage by an Irish volunteer. After the initial assault on the senses, smell first, then sight and sound, one becomes aware of individual children with shocking medical conditions. Children with swollen bellies from sprue, kwashiorkor or parasitic diseases were a common sight. Children with movement disorders and severe dermatoses were also common. Other children who had bones softened by rickets and who had been bound up in a position that would make it easy to clean them after defecation, were left with lower limbs so crooked that they could drape them over their shoulders. These children would never stand erect. Some of them learned to walk on all fours, and with shoes on their hands and feet, moved eerily like animals through the concrete jungle they lived in. Many children who were unable to walk often had draining pressure sores from sitting on the cold concrete floors or lying on urine-soaked beds.

I was told that none of the children in this orphanage had been tested for HIV. The orphanage, tragically, was located near the port city of Constanza in which the blood supply was said to be most contaminated, and pediatric HIV disease was most prevalent. Though reliable data are scarce, the disproportionate prevalence of HIV infection among Romanian children has been attributed to the parochial Romanian practice of giving micro-transfusions of a few cc's of blood to newborns for almost any reason, such as being underweight. It was reasonable to assume that a number of these children were HIV-positive. There were at least two with a progressive wasting illness that was probably due to advanced AIDS.

Initially I had serious concerns about what we would be able to achieve in this environment. I met with the physician-director of the facility and though he was very defensive about the deplorable conditions in this institution he seemed willing to cooperate with a Western peer. He was acutely aware of the international scrutiny this problem was getting. Afterwards we met almost every day to discuss problems regarding the facility as well as specific children. We were fortunate not only because the 25 Irish and English volunteers provided an effective staff, but also because they brought with them an ample supply of medicines.

In addition to addressing the acute problems and injuries that arose daily, over the course of the month we examined and established a chart on 150 children and included basic subjective and objective data. We established a diagnostic and treatment algorithm for the many children with abdominal distention based on the resources we had available to us. The lay volunteers prepared special meals to supplement the nutrition of the most malnourished children and fed them by hand. Where appropriate we began dosing medication according to weight, something which had not been previously done. We established a basic system for administration of medication so that orders were to be made in writing and administration of medication was documented.

We also spent a significant amount of time administering to the needs of the community outside the orphanage. It was an exceedingly poor community with limited access to medical care. Service to the town not only provided needed medical care, it elevated the local perception of the orphanage as a resource rather than a burden to the community.

I am sometimes asked why I chose Romania. True, the images of Romanian children suffering in orphanages are graphic and moving. But so are the images we see from our own inner cities, Indian reservations and many Third World countries. Why not South Providence, South America, the Indian Health Service, Pakistan or Somalia? In my case it has something to do with serendipity. I happened to meet Dr Lawlor at a time when it was feasible for me to go, and I was excited by the prospect of travel and immersion in a foreign culture. I also felt my facility with Romance languages would be useful in Romania, and I was attracted by the opportunity to work mostly with children.

*Young children with cranial abnormalities, two to a crib.*

But most compelling for me were the philosophical motivations. I found it particularly disturbing that these conditions were the product of an errant idea invented by men and forcibly imposed. Unlike a natural disaster or even passive neglect arising out of

poor or inefficient government, the children's Gulag was an active intervention, a premeditated act of cruelty committed in the name of the perverse Marxist ideal. The fall of the Soviet Union and the liberation of the Eastern block were events in which I took great emotional and intellectual satisfaction. Yet the crimes of this system lived on in the cruelties that were daily perpetrated upon these children. The capacity to call attention to those crimes against children and to begin to rectify them, albeit in a small fashion, gave me a great sense of satisfaction.

My time in Romania was brief, and my contributions paled beside those of my Irish and English colleagues and many others who had committed a larger part of their lives to work there. It was, however, an extraordinarily satisfying experience. The experience has left an enduring impact and I hope to return at least once each year. Since my return to the States I have joined the board of directors of the Free Romania Foundation and have been active in reorganizing the structure of the foundation. The new foundation will attempt to focus on coordinating the relief efforts of many of the NGOs in Romania in order to avoid duplication of effort and will attempt to enlist greater collaboration with academic centers both here and in Romania. Projects under development include a day hospital to provide rehabilitative services, programs to train Romanian caregivers working in the orphanages, a Romanian Foster Care Program, training in pre-hospital and emergency care, and initiatives to reduce lead exposure in high-risk areas. There will also be a need to develop programs for the detection and treatment of HIV disease in children as well as to treat the alarming number of orthopedic deformities that afflict these children.

***Children with mild deformities such as learning disabilities, visual or hearing impairments, cleft palates or even those who merely resided in the lower percentiles for height and weight, were condemned to these inhuman facilities.***

Despite the international outpouring of support there is a great need for the services of volunteer physicians and lay persons in this and in other parts of the world, and it is an experience I recommend highly.

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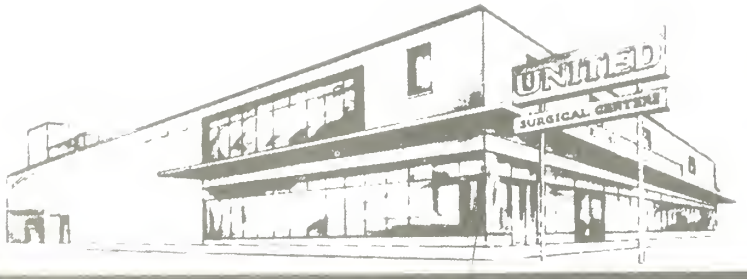


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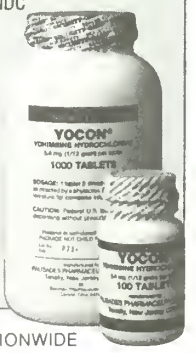


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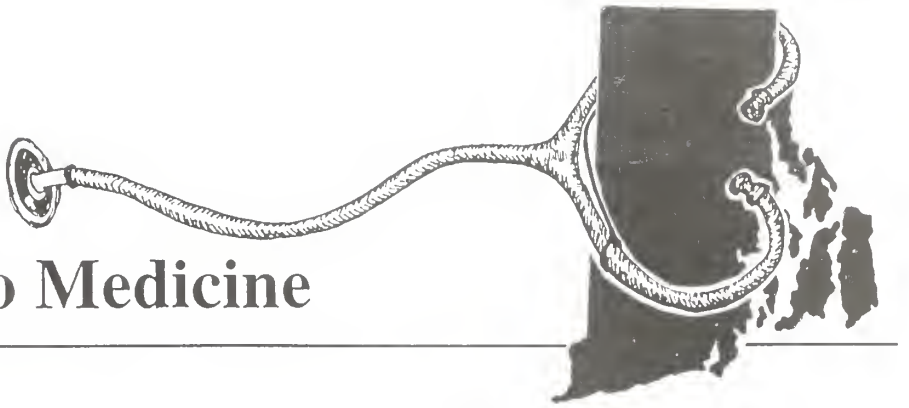
# Rhode Island's Contributions to Medicine



# Rhode Island's First Woman Physician

Seebert J. Goldowsky, MD

Doctor Anita Elizabeth Tyng was the first female member of the Rhode Island Medical Society. Doctor Tyng, who graduated from the Woman's Medical College of Pennsylvania in 1864 and was elected to the Rhode Island Medical Society in 1872, died in 1913 at the age of 75.

It had been the conventional wisdom about the Rhode Island Medical Library that Doctor Tyng was also the first female doctor in Rhode Island. Our late colleagues who lived around the turn of the century would have known better. It appears that Doctor Tyng was, in fact, not the first female doctor in Rhode Island, but the third.

While searching the microfilm files of *The Providence Daily Journal* for the year 1855 concerning some matter which now escapes the writer, he found the following advertisement in the issue of October 9:

**MARTHA H. MOWRY, MD**
**OFFICE**
**22-1/2 SOUTH MAIN ST.**

Miss Mowry's duties as Professor at the Female Medical College of Philadelphia, (located 229 Arch St., Philadelphia,) having closed for the season, has resumed her practice in Providence, and can be found at her office, 22-1/2 South Main St. Office hours from 8 to 10 a.m., from 12 to 3, and from 6 to 7 p.m.

Visits made to patients in the city or country.

The notice appeared several times during those autumn weeks. It stimulated the inquiries on which this sketch is based.

### Birth and Childhood

Martha Harris Mowry was born in Smithfield, Rhode Island on June 7, 1818, the second child of Thomas and Martha Harris Mowry. Their first child, Immer Earl Mowry, was born in 1812. Her paternal grandfather, "Clark" Daniel Mowry, had been Smithfield town clerk and clerk of the Probate Court, and was prominent in local affairs. Father Thomas Mowry was described as "a strong and vigorous man, both mentally and physically. He was one of those men, of whom we have too few, that do their own thinking. He received his opinions from the *ipse dixit* of no man. He read for himself and thought for himself. It would not be strange, therefore, if he did not agree in all things with those with whom he was surrounded."

A few months after Martha was born, her mother died. Martha was raised by her paternal aunt, Amey Mowry, who never married. When Martha was 3, her father married Polly Buffum. No children were born to this marriage.

Martha attended the schools of Miss Sterry and Miss Chace in Providence, and in 1825 at the age of 7 was sent to Walker's Academy, and later to the Friends' Yearly Meeting Boarding School in Providence. She remained there until 1832, when she went to Miss Latham's select boarding school, and later to Miss Winsor's young ladies' boarding school.

While at the latter she was taken ill with "heart weakness" (rheumatic

---

*Dr. Goldowsky is the Editor-in-Chief Emeritus of this journal. This article first appeared in the November 1971 issue of* Rhode Island Medical Journal.

fever?) from which she continued to be affected to some extent for 4 years.

Upon regaining her health, she was sent to study in the Green Street Select School in Boston where Margaret Fuller, the great 19th century feminist and later the Marquesa Ossoli, was teaching. After leaving school Martha continued to study languages and Oriental literature, developing a gift for languages which was undoubtedly inspired by her eminent teacher.

### Medical Studies

Sometime during 1844 she resolved to undertake the study of medicine, a then almost unheard of vocation for a woman. At that time no woman had yet been admitted to a medical college. She studied with a number of prominent local physicians, including Doctor Esekiel Fowler of Woonsocket, the noted Doctor Joseph Mauran, and Doctor Charles W. Fabyan, both of Providence. A Doctor de Bonneville is also mentioned, possibly a peripatetic teacher, who in 1847 resided at the Mansion House in Providence.

In the winter of 1849-50 she was asked to take charge of a medical college for women in Boston. To fit herself for this work, which apparently never materialized, she continued her studies under Doctors Paige, Gregory, Cornell, and others, none of whom were members of the Rhode Island Medical Society or are otherwise readily identifiable. Doctor Paige was said to have established a school in Providence in which Martha took a course in electropathy, for which she received a diploma. She was esteemed as a lecturer, and the Providence Physiological Society presented her with a silver cup in recognition of her services as a lecturer, and as a token of their respect and confidence.

### Woman's Medical College

According to her newspaper obituary Martha "received a diploma as 'MD' from a Philadelphia Allopathic Medical School in 1853, after being examined for the degree by a committee of physicians and in the same year was appointed to a professorship in the Female Medical College of Pennsylvania, which was then only 3 or 4 years old." Founded in 1850, the school became co-educational in 1970 and changed its name from The Woman's Medical College of Pennsylvania to the Medical College of Philadelphia,

The minutes of the corporation of Woman's Medical College for May 10, 1853 noted that "A communication was received from the Dean of the Faculty recommending that the Honorary Degree of MD be conferred on Martha H. Mowery (sic) of Rhode Island and that she be selected Professor of Obstetrics and Diseases of Women and Children in this College."

An entry for May 12 reported that the honorary degree had been conferred on that same day and that the recipient was elected to the faculty. A letter from Martha accepting the appointment to a chair in the college was read into the record on June 10. During the ensuing year Martha was listed as present at all faculty meetings. Her tenure, however, was brief. In a letter dated April 26, 1854, she resigned from the faculty. This letter was taken note of in the corporation minutes of September 6, 1854. Her name appeared in the 1853 college catalogue for the academic year 1853-1854.

### Return to Providence

She returned to Providence where she resumed her "regular" (ie, allopathic) practice of medicine. Martha's resignation from the Woman's Medical College faculty was written in April 1854 and accepted in September of 1854. There is no ready explanation for the statement in her advertisement of October 1855 implying that since the Female Medical College had "closed for the season" she had "resumed practice in Providence." This was no temporary state of affairs. Her successor at the college had already in fact been selected on September 18, 1854 and served for the whole session of 1854-55.

Polly Mowry died on February 20, 1842, leaving Thomas widowed once again. About this time he joined his married son Immer Earl in Providence, where the latter conducted a grocery business at 20 South Main Street. Their home was at No. 22. Martha, listed for the first time in 1850, lived at the same address, identified as "M. H. Mowry, Miss, physician." Her name also appeared in the listing of physicians in the same directory, although she was not mentioned as a member of the Rhode Island Medical Society. This accords with society records. By 1854 Immer Earl had moved to a new address and became bookkeeper at the Eagle Screw Company. The grocery business did not appear after 1844.

Henceforth the household at 22 South Main Street consisted of Thomas, now aged 65, and daughter Martha. She had lived and practiced in Providence some 3 years before her sojourn in Philadelphia; it is not surprising that her father desired her to be with him again during his advancing years. He lived until 1872, when in his 87th year he passed on. He was described in his obituary as "a well-known Providence merchant in the early part of the century."

### Move from South Main Street

In 1867 Martha and her father moved to 30 South Main Street, where she lived and maintained her office until 1870. Her father's name appeared only sporadically, but it was listed with hers in 1872, the last year of his life. From 1870 she lived at various addresses on North Main Street (446, 605, and 601). In 1880-82 she lived at 25 College Street, then on Chestnut Street, and from 1886 until her death at 148 Friendship Street. In 1873 she conducted a hydropathic institute in connection with her home and office.

Little is known now of her practice. Her newspaper obituary stated that she was "believed to have been the first woman to regularly practice medicine in the city." She was reputed to have had an "extensive and lucrative practice," which she carried on actively for more than 40 years.

### Feminist Activities

Martha Mowry was one of the earliest members of the Association for the Advancement of Women, and

for a number of years was its vice president. After the death of her Aunt Amey in 1863 she was regularly chosen president of a religio-benevolent society in Smithfield, founded by her aunt in 1856. She was a member of the Rhode Island Woman's Club from its founding, the Women's Educational and Industrial Union (of which she was also treasurer), the Providence Franklin Society, the Rhode Island Horticultural Society, and the Veteran Citizens' Historical Society.

She had always been interested in educational matters, and since her early training under Margaret Fuller was an accomplished scholar in classical, Hebrew, and Oriental literature. A pioneer in the women's suffrage movement, she attended the Woman Suffrage Convention held in Worcester, Massachusetts in 1850.

### Career Attainments

Martha never married. In her obituary she was described as "a woman of unusual attainments . . . without doubt . . . largely instrumental in leading the way in the field of professional and scientific work for the women of this country."

Martha suffered a severe shock in 1897 and was not "expected to live a great length of time." She succumbed suddenly to a second bout of apoplexy in her home on Friendship Street on August 29, 1899 in her 82nd year. Her funeral was held on August 31 from the Chapel of the First Congregational Church on Benevolent Street in Providence.

### Note on Julia A. Beverly

During perusal of Providence directories to locate Martha Mowry's various abodes, the existence of another female physician contemporary to Martha became apparent. Julia A. Beverly was listed as a "physician" at 61 Mathewson Street in the directory of 1853. On several occasions a "Mrs." was associated with her listing. She moved about quite a bit, practicing variously at 68 Clifford, 36 Stewart, 279 Westminster, 367 High, and finally at 27 Winter Street, all on the west side of the Providence River.

*The Providence Daily Journal* of November 15, 1876 carried the following news item: "Sudden Death – Mrs. Julia A. Beverly, a well known doctress, living at No. 27 Winter Street, returning from a professional call, fell in a fit of apoplexy in the entry of her house." This had occurred on the 13th. "Medical aid was summoned," the report continued, "but all attempts to restore her consciousness were in vain." She died on the 14th of November in her 63rd year. The obituary notice identified her as "Julia A. Beverly, MD." She was buried from the New Jerusalem Church at Broad and Linden Streets.

Nothing more is known of Julia. The authenticity of her MD degree has not been verified, and the quality of her education or training has not been ascertained. She was not a member of the Rhode Island Medical Society.

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## Eye Care for Persons with Diabetes in Rhode Island

Diabetes mellitus is a chronic illness, estimated to cost Americans $20 billion each year for medical care and in lost productivity.[1] The treatment of potentially severe complications, including diabetic retinopathy, a leading cause of blindness, accounts for much of this cost. With careful monitoring and early treatment, we can control diabetic eye disease. The 1989 position statement of the American Diabetes Association, *Standards of Medical Care for Patients with Diabetes Mellitus*[2] recommends annual eye examinations for m persons with diabetes.

As a supplement to its 1990 statewide Health Interview Survey (HIS), the Rhode Island Department of Health recontacted 150 randomly selected adult diabetics in 1991 for in-depth information on health, risk factors, and medical care use. The 1990 HIS reached a random sample of Rhode Island households by telephone, using random digit dialing, and achieved a response rate of 79%. The supplemental Diabetic Survey was designed to assess adherence to *Standards of Medical Care for Patients with Diabetes Mellitus.*[2] The figures below contain preliminary data pertaining to the entire sample of persons with diabetes.

**Respondents.** Eighty-nine percent of respondents were ages 40 and over; 52% were ages 65 and over. Females were in the majority (54%), and whites predominated (89%). Forty-five percent had family incomes under 200% of the federal poverty level. About a third of the sample (34%) had been diagnosed within the past 5 years. Almost all respondents (95%) had a usual physician for diabetes care. A fifth of the sample was not medicated for diabetes, and 31% used insulin.

Eye Care. Most persons with diabetes had received an eye exam within the past year (79%; Figure 1). Almost three-fourths of all persons with diabetes had received a dilated exam. The date of the last eye exam varied little by insulin use (Figure 2). Eleven percent of persons with diabetes reported some diabetes-related eye disease (Figure 3). Six percent reported having glaucoma, 28% reported having cataracts, and 21% reported serious trouble seeing (even when wearing glasses).

Rhode Island has the highest diabetes mortality of the 50 states. To address this problem, the Centers for Disease Control have supported the Rhode Island Diabetes Control Program since 1979. The program is planning a variety of interventions to minimize diabetic eye disease, including a project to increase the proportion of patients in a statewide independent practitioner association who receive annual dilated eye examinations.

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*Submitted by Donald Perry, AB, John P. Fultion, PhD, and Dona Goldman, RN, MPH, Office of Chronic Disease Prevention and Health Promotion.* Health by Numbers *is edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD.*

**Fig 1 – Percentage of Rhode Islanders with diabetes having an eye exam within the past 12 months, by type of exam.**

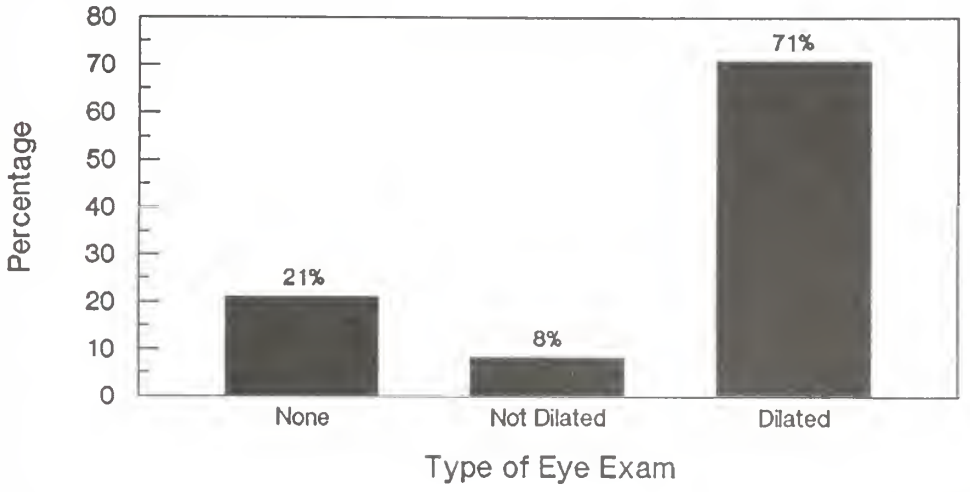



**Fig 2 – Percentage of Rhode Islanders**

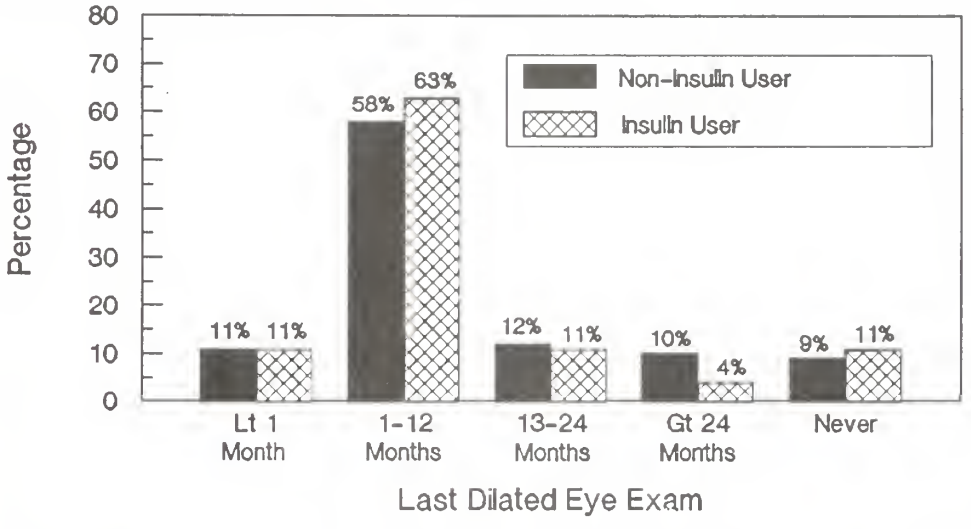
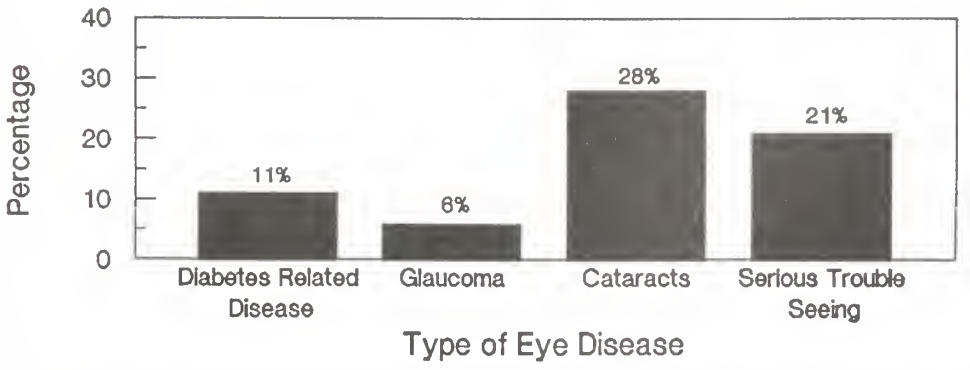



**Fig 3 – Percentage of Rhode Islanders with diabetes having eye problems, by type of problem.**



# NECROLOGY 1992

**Thomas A. Nestor, MD**

Dr Thomas A. Nestor, 81, of South Kingstown, died at home Sept. 24. He was the husband of Mary V (Lipscomb) Nestor.

Dr Nestor, a general surgeon and family doctor, was also a World War II hero who won the Silver and Bronze Stars. As a major in the Army's 511th Parachute Infantry, the young surgeon jumped out of planes, sometimes under fire, to reach wounded soldiers on battlefields of the South Pacific.

He was among the first Army doctors to use the newly discovered – and hard-to-get – wonder drug, penicillin.

After the war, Dr Nestor came to Wakefield, joining the staff of South County Hospital in 1946 and setting up a private practice.

Dr Nestor was a graduate of Providence College and the University of Maryland Medical School, and was a member of several medical and surgical societies.

Born in Providence, he was a son of the late Dr Michael James Nestor and Anoinette (Agnew) Nestor.

Besides his wife, he is survived by eight children, Dr Thomas A. Nestor Jr, of Mililani Town, Hawaii; Michael Nestor of Fullerton, Calif.; Mary Ellen Davis of Willow Grove, Pa.; Timothy Nestor of Narragansett; John Nestor of Pawtucket; Joseph Nestor of Welch, W.Va.; Dr Elizabeth Nestor of Wilmington, Del.; and Martha Badigian of West Kingston; three sisters, Mary Higgins, Agnes Fitzgerald and Katherine Turgeon, all of Providence; a brother, James Nestor of Cleveland; and 10 grandchildren.

**H. R. McKendall, MD**

H. Raymond McKendall, MD, 69, of Providence, an ophthalmologist on Angell Street since 1955, died Nov. 6 at home. He was the husband of the late Rita (Eichell) McKendall.

Born in Providence, he was a son of the late George D. and Jennie (Caputo) McKendall.

Dr McKendall was a graduate of Providence College with a degree in biology. He received his medical degree from New York Medical College. He did post-graduate work at Harvard Medical School. He served his rotating internship at Queens General Hospital, New York, and was later admitting physician at the hospital. He was on the staffs, as a surgeon, of Rhode Island Hospital, St. Joseph Hospital, Providence, and Miriam Hospital from 1955 until the present. He was a consultant surgeon at Memorial Hospital since 1955, and was a past president of the medical staff at Roger Williams Hospital. He was clinical assistant professor in ophthalmology surgery at Brown University since 1972, and was also an instructor in practical ophthalmology at Brown since that time.

He was a member of the American Board of Ophthalmology, and a board member of the Health Care Review, and chairman of the by-laws committee at Rhode Island Hospital. He was a fellow of the American Academy of Ophthalmology, and a fellow of the New England Ophthalmology Society. He was a member of the American Association of Ophthalmology, the Providence Medical Society, the Rhode Island Society of Eye Physicians & Surgeons, the American Medical Association, the Pan-American Society of Ophthalmology, and the American Society of Cataract & Refractive Surgery.

Dr McKendall was an Army veteran of World War II, served as captain, and was chief of eye, ear, nose and throat medicine at Camp Kilmer Hospital, New Jersey. He was chief of ophthalmology at Fort Jay Hospital, New York. He also served in the Naval Reserve.

He leaves four daughters, Mary Ann McKendall, MD, of Shrewsbury, Mass.; Marita Pierce of North Scituate; Maureen McKendall-Deveau of Fairfield, Conn.; and Miriam J. McKendall of Boston; two sons, George R. McKendall, MD, of Providence; and Raymond A. McKendall of Philadelphia, Pa.; two sisters, Elvira and Eva McKendall, both of Providence; a brother, Dr Benjamin S. McKendall, MD, in Florida; and two grandchildren.

**Zbigniew A. Zawadzki, MD**

Zbigniew A. Zawadzki, MD, 71, of Providence, a Polish-born physician, researcher, journalist, and a professor at the Brown University School of Medicine before retiring in 1987, died Dec. 7 at home. He was the husband of Urszula (Zalewska) Zawadzki. He was also the husband of the late Danuta (Nowotczynska) Zawadzki.

Born in Sosnowiec, Poland, he was a son of the late Stanislaw and Sabina (Paliga) Zawadzki.

He came to this country in 1961 with his first wife, a dentist, and his two daughters. Settling in Pittsburgh, Pa, he became chief of hematology-oncology at the Veterans Administration Hospital, and associate professor of medicine at the University of Pittsburgh School of Medicine.

Dr Zawadzki moved to Providence in 1974, and joined the faculty at Brown University as associate professor of medicine. He was also chief of clinical immunology at Memorial Hospital.

After the outbreak of World War II, he was forced to continue his higher education in the Warsaw underground medical school, since the Nazis had closed all schools of higher education in the country. He received his medical degree summa cum laude from the University of Warsaw School of Medicine. He did his internship and residency at the Warsaw City Hospital, and the medical school. At the same time, he was an active member of the Polish underground resistance.

He completed a hematology fellowship at Tufts-New England Center Hospital, Boston, and practiced as a hematologist-oncologist. He was internationally recognized for his

research in multiple myeloma, and other blood disorders.

Besides his wife he leaves two daughters, Barbara E. Zawadzki, MD, of Pittsburgh, and Joanna K. Zawadzki, MD, of Washington, DC; a stepdaughter, Hanna Zembala, of Tarnowskie Gory, Poland; and six grandchildren.

**William A. Reid, MD**

William A. Reid, MD, 78, of Glocester, chief of gynecology at Women & Infants Hospital before retiring in 1990, died Sept. 19 at home. He was the husband of Roslyn (Kerney) Reid.

Born in Douglas, Mass, a son of the late William and Annie (Pollitt) Reid, he lived in Rumford before moving to Glocester in 1954.

Dr Reid was a 1936 graduate of the former Rhode Island State College, now the University of Rhode Island. He was graduated from Tufts University Medical School in 1940. He interned at Rhode Island Hospital where, along with the former Lying-in-Hospital, now Women & Infants Hospital, he also did his residency.

He was in private practice in Providence from 1948 until 1970. He was the first gynecologist and department head of the newly formed Rhode Island Group Health Association, now the Harvard Health Plan. He was a trustee of Women & Infants Hospital. He was a consultant in obstetrics and gynecology at Rhode Island Hospital and Roger Williams Hospital.

Dr Reid was a past president of the Rhode Island Medical Society, a past secretary of the Providence Medical Association, and a member of the American College of Obstetricians and Gynecologists. He was an emeritus fellow of the Obstetrical Society of Boston.

He was a past assistant clinical professor at Brown University Medical School, and at Tufts University. He was a past assistant in obstetrics at Harvard.

Among his awards was the Medical Staff Award from Women & Infants Hospital in 1990. He was a former state representative from Dist. 1, East Providence, from 1952 to 1954, a state representative from Glocester, 1964 to 1966, a member of the Glocester Town Council, 1961 to 1964, and a past member of the board of directors of Rhode Island Blue Cross, and Rhode Island Blue Shield.

Dr Reid was an Army veteran of World War II, and served as a captain in the Medical Corps. He was assigned to the 166th General Hospital in France for 11 months, and served as chief of the women's section of the England General Hospital in New Jersey when he returned to this country.

He was a member of the vestry of St. Thomas Episcopal Church, Greenville, where he served as a senior warden, and was a choir member.

Besides his wife he leaves a son, Peter A. Reid of North Kingstown; a daughter, Martha R. Brown, RNC, MSN, of Glocester; a brother, Donald J. Reid of Harrisville; and two grandchildren.

**Dr Charles D. Charon, Jr., MD**

Charles D. Charon Jr., MD, 60, of North Smithfield, a surgeon in private practice for 34 years, died Dec. 25. He was the husband of Carol (Murray) Charon.

Born in Detroit, Mich, a son of the late Charles Charon Sr. and Simone (Joyal) Charon, he moved to Woonsocket as a child.

Dr Charon was a member of the Rhode Island Medical Society. He was a past president of the Fogarty Hospital medical staff. He was a member of St. John the Evangelist Church, Slatersville.

Besides his wife he leaves two sons, Christopher and Brian Charon, both of North Smithfield; and two daughters, Michelle Charon of Chicago, Ill., and Nicole Charon of North Smithfield.

**Dr Edward J. Butler, Jr., MD**

Dr Edward J. Butler Jr., 74, of Pawtucket, a practicing physician in family medicine in Pawtucket for more than 40 years, died Aug. 16 at home. He was the husband of Laura (Tierney) Butler.

Born in Providence, a son of the late Edward J. and Phoebe (Steere) Butler, he lived in Pawtucket for most of his life.

Dr Butler was a 1939 graduate of Providence College, and then served in a MASH unit as a staff sergeant in the South Pacific. He then graduated from Tufts University School of Medicine in 1949. He did post-graduate training at Boston City Hospital and Memorial Hospital, Pawtucket.

He was a member of the staff of Memorial Hospital and the former Notre Dame Hospital. He was a member of the Pawtucket, Rhode Island and American Medical Societies.

In 1981, he was honored by the Christian Brothers when he received his letter of benefaction from the vicar general of the Institute of the Brothers of Christian Schools for his charity and devotion to the Brothers of Long Island-New England Province.

He served as athletic physician at St. Raphael Academy, Pawtucket, for many years. He was a communicant of St. Teresa's Church.

Besides his wife, he leaves two sons, William P. Butler of Pawtucket and and Dr Edward P. Butler of Winchester, Mass.; three daughters, Patricia L. Leclaire of Pawtucket, Susan E. Noonan of Barrington, and Marianne Stevens of Rehoboth, Mass.; two brothers, Austen Butler of North Attleboro, and Alan Butler of Peace Dale; and 11 grandchildren.

**Carl Sawyer, MD**

Carl S. Sawyer, MD, 79, of Providence, chief of the dermatology department at Rhode Island Hospital from 1952 to 1977, and former associate clinical professor of medicine (dermatology) at Brown, died Aug. 3 at Rhode Island Hospital. He was the husband of the late Mary E. (Doliber) Sawyer.

Born in Providence, he was a son of the late Carl D. and Ethel G. (Stevens) Sawyer.

Dr Sawyer graduated from Brown University in 1934, and earned a medical degree at McGill University in 1939. He served his internship at Rhode Island Hospital, and his residency at Massachusetts General Hospital, Boston.

He joined the staff of Rhode Island Hospital in 1944, and became chief of dermatology in 1952. He continued to serve as a consultant until his retirement in 1986. During his career, he served as registrar of records, and chairman of the records committee at Rhode Island Hospital. He was a member of the consulting staff at Homberg Infirmary at MIT, the Chelsea Soldiers Home, Chelsea, Mass, the former Charles V. Chapin Hospital, Roger Williams Hospital, Women & Infants Hospital, Memorial Hospital, the Veterans Administration Medical Center, Butler Hospital, the St. Elizabeth Home, the Home for Aged Couples, now Steere House, and the Andrews House at Brown University.

Dr Sawyer was a member of the Rhode Island Medical Society, its grievance committee, the Providence Medical Society, the American Medical Association, the Rhode Island Dermatology Society, the New England Dermatology Society, and was a fellow of the American Academy of Dermatology. He was a member of Theta Delta Chi Fraternity, Agawam Hunt, the Mount Tom Club, and the Friday Night Club.

He leaves five sons, Carl D. Sawyer of Peace Dale; Eric S. Sawyer of Bolton, Conn.; David F. Sawyer of Johnston; Richard R. and Peter W. Sawyer, both of Providence; three daughters, Elizabeth Fitzgibbons of Hope; Mary D. Sawyer of Kansas City, Mo.; and Laura D. Sawyer of Sharon, Mass.; three sisters, Norma Hammer of Fort Myers, Fla.; Paula Fisher of Valley Forge, Pa.; Jacquelyn Sinkinson of Farmington, Maine; and five grandchildren.

**Henry B. Grainger, MD**

Henry B. Grainger, MD, 76, of Charlestown, died Oct. 5 at Westerly Hospital. He was the husband of the late Anne C. (Ramey) Grainger.

Born in Boston, a son of the late Henry J. and Catherine (Coulthurst) Grainger, he lived in Charlestown for many years.

Dr Grainger was a graduate of Boston College and Tufts University Medical School. He was a Naval medical officer in World War II and held the rank of lieutenant. He participated in the D-Day landing on Utah Beach, Normandy, France.

In 1952, he joined Samuel S. Farago, MD, now deceased, in the practice of family medicine. He was a charter fellow of the American Academy of Family Physicians. He was a member of the Rhode Island Medical Society, the Washington County Medical Society, and the Massachusetts Medical Society.

Dr Grainger was the physician and health officer for the Stonington, Conn, public school system. He was an honorary staff physician at Westerly Hospital. He was a communicant of St. Clare Church, Misquamicut.

He leaves three sons, John C. Grainger II of Keene, N.H.; James P. Grainger of Charlestown; and Matthew R. Grainger of Douglas, Mass.; two daughters, Jane Daly of East Greenwich and M. Catherine Craig of Charlestown; a brother, Richard E. Grainger of Wellesley, Mass.; two sisters, Marie L. Grainger of Dedham, Mass., and Rita Cunningham of Wellesley; eight grandchildren and two great-grandchildren.

**Priscilla Sellman, MD**

Priscilla Sellman, MD, 83, of East Providence, an anesthesiologist and a member of Anesthesiology Associates at Rhode Island Hospital for 33 years before retiring in 1973, died Feb. 21 at the hospital.

Born in Newton, Mass, a daughter of the late John H. and Blanche L. (Hayberger) Sellman, she lived in Riverside for 35 years.

Dr Sellman was a graduate of Vassar College in 1931, and the Boston University School of Medicine in 1936. She had a fellowship at the Lahey Clinic from 1937 until 1941. She was a member of the Rhode Island, Massachusetts, and American Medical Societies. She was a member of the Appalachian Mountain Club.

She leaves a sister, Constance S. Dixon of Little Compton.

**Daniel J. Dorman, Jr., MD**

Dr Daniel J. Dorman Jr., 67, of Naples, FL, a radiologist in Barrington before retiring, died Jan. 30. He was the husband of Catherine (Gerrity) Dorman.

Born in Lawrence, Mass., he was a son of the late Daniel Joseph and Nettie (Barnard) Dorman. He lived in Naples three years and previously had lived on Martha's Vineyard, Mass.

He graduated from Boston College in 1949, and from Tufts Medical School in 1952. Dr Dorman had been a pediatrician in Fall River, Mass.

During World War II, he served in the Army with the 75th Infantry Division. Dr Dorman fought in the Battle of the Bulge, and was a member of the Ardennes, a French honorary auxiliary.

Besides his wife, he leaves two sons, Mark Dorman of Fall River and Army Capt. John Dorman of Fort Sill, Ok.; four daughters, Karen Goussaid of Montreal, Canada; Linda Flynn of North Smithfield; Mary Dellefratte of West Warwick; and Ellen Dorman of Naples; a sister, Nathalie Agostino of Nantucket, Mass.; and eight grandchildren.

**Waldo O. Hoey, MD**

Waldo O. "Dick" Hoey, MD, 88, of Boca Raton, FL, died Oct. 5.

Born in Frederica, Del., he was a son of the late William F. and Alberta B. Hoey.

Dr Hoey was a surgeon in Providence for 40 years and retired to Florida 14 years ago. He was a commander in the Navy Medical Corps in World War II and served in the Atlantic and Pacific Theaters. He was a member of the Military Order of Foreign Wars, and the American Legion in Providence.

He had served as chief of surgery at Roger Williams Hospital, Providence, for 17 years. He was a founder and a past president of the Providence Surgical Society, and a past board member of Blue Cross & Physicians Service in Rhode Island. He was a fellow of the American College of Surgeons, and the International College of Surgeons. He was a diplomate of the International Board of Surgery.

Dr Hoey was a member of Agawam Hunt, the Barrington yacht Club, and the Rhode Island Country Club.

He leaves his wife, Nina J. Hoey of Boca Raton; two daughters, Melissa Robbins of Boca Raton, and Nancy Bacher of Foxboro, Mass.; and three grandchildren.

**Chin T. Wang, MD**

Chin Tsei Wang, MD, 82, of Cranston, a physician at the IMH for 15 years before retiring in 1981, died Sept. 7 at home. He was the husband of Mao (Tai) Wang.

Born in China, a son of the late Ming Chi and Shih (Sun) Wang, he lived in Cranston since coming to this country in 1966.

Besides his wife he leaves a son, Thomas Wang of Cherry Hill, N.J.; three daughters, Johnna Ho of Redding, Conn.; Julia Huang of Cranston; and Clara Han of Plano, Texas.; 11 grandchildren and a great-grandson.

**Joseph M. Zucker, MD**

Joseph M. Zucker, MD, 80, of Laguna Hills, Calif., died April 22 at home. He was the husband of Ruth (Reiner) Zucker.

Born in Pawtucket, a son of the late Samuel H. and Mary (Goldberg) Zucker, he lived in Providence for 37 years before moving to California 21/2 years ago.

Dr Zucker was a 1932 graduate of Brown University, and a 1936 graduate of Johns Hopkins University Medical School. He served in World War II as a major in the Army Medical Corps. He practiced medicine in Rhode Island for 37 years with an office in Providence.

He was a fellow of the American Psychiatric Association, and a member of the American and Rhode Island Medical and Psychiatric Associations. He was a member of Temple Emanu-El, Providence, its Men's Club, and Temple Judea, Laguna Hills. He was a member of Redwood Masonic Lodge.

Besides his wife he leaves a son, Michael R. Zucker of Newfane, Vt.

**Edward Seltzer, MD**

Edward L. Seltzer, MD, 91, of Pawtucket, a surgeon in private practice, and on the staffs of Miriam and St. Joseph Hospitals for 40 years before retiring in 1977, died May 17 at the Oak Hill Nursing Home. He was the husband of Gladys (Rosen) Seltzer.

Born in Toronto, Canada, a son of the late Hyman and Miriam Seltzer, he lived in Providence and Cranston before moving to Pawtucket 11 years ago.

Dr Seltzer was the first president of the surgical staff at Miriam Hospital. He was a member of the Rhode Island Medical Society, and a fellow of the American College of Surgeons.

He was a graduate of the University of Toronto Medical School. He was a member of Temple Beth-El and its Brotherhood. He was an Army veteran of World War II, and served as a captain in the Medical Corps in the European Theater.

Besides his wife he leaves a son, Paul D. Seltzer of Fort Lauderdale, Fla; two daughters, Gail Stern of Providence, and Patsy Reiser of Needham, Mass; and four grand-children.

**Cephas W. Jackson, Jr., MD**

Dr Cephas W. Jackson Jr., an ophthalmologist with offices in Providence and Bristol, was killed when the single-engine aircraft he was piloting crashed March 28 while approaching an airport in Elkview, WVa.

Dr Jackson, who lived with his wife, Dr Barbara A. Jackson, in Norton, Mass, was also an associate clinical professor at the Brown University Medical School.

In his private practice he was associated with Dr Robert Kinder and Dr Paul Sydlowski.

Dr Jackson was born in Richmond, VA. He was still a child when the family moved to Massachusetts.

He was a graduate of Malden, Mass. High School, and received his bachelor's degree in chemistry at the North Carolina Central University, and his doctor's degree in medicine at Howard University in Washington in 1975.

Shortly after graduation from Howard, he moved to Providence and joined the ophthalmological staff at Rhode Island Hospital. He lived in Providence until moving to Norton 4 years ago.

Dr Jackson was a member of the John T. Hilton Masonic Lodge in Boston, and was serving his second term as Most Worshipful Master at the time of his death.

He also was a member of the Omega Psi Phi Fraternity in Providence and was a fellow of the American Ophthalmological Association.

Dr Jackson was formerly married to the former Inez Reade; they had two daughters, Lisa Marie Jackson and Dawn Cheryl Jackson.

Besides his wife, and daughters, Dr Jackson leaves his father, Cephas W. Jackson Sr. of Stoughton, Mass., and a sister, Josephine Jones of Richmond, Va.

**Upton Savoie, MD**

Upton A. Savoie, MD, 85, of Lincoln, died May 22 at home. He was the husband of Ethel (Lalonde) Savoie.

Born in Pawtucket, a son of the late Jay Upton Savoie, MD, and Marie Louise (Corneau) Savoie, he moved to Lincoln in 1970.

Dr Savoie attended Assumption College, Worcester, and was a graduate of Providence College. He received his medical degree from the University of Montreal, and did post-graduate work at McGill University Medical School before beginning practice in Pawtucket.

He was an obstetrician and staff physician at Notre Dame, Central Falls, and Memorial Hospitals. He was a member of the American Medical Association, the Pawtucket Medical Society, and the Rhode Island Medical Society. During World War II, he received the Presidential Commendation for volunteer medical work with the military.

Besides his wife he leaves a son, Upton A. Savoie, Jr., of Warren; four daughters, Carolyn E. O'Neil and Janet S. Savoie, both of Nashville, Tenn.; Jacquelyn S. Medina of Clinton, N.Y.; and Paula S. Roll of Hamden, Conn.; and 16 grandchildren.

THE RHODE ISLAND MEDICAL JOURNAL

The Official Organ of the Rhode Island Medical Society
Issued Monthly under the direction of the Publication Committee

VOLUME I
NUMBER 1

PROVIDENCE, R. I., JANUARY, 1917

PER YEAR $2.00
SINGLE COPY, 25 CENTS

# THE RHODE ISLAND MEDICAL JOURNAL HERITAGE

**90 Years Ago**
**(March 1902)**

The lead editorial, entitled "The Physician's Leisure," acknowledges that some sort of relaxation or diversion is a necessary element in the daily schedule of the busy practitioner. However, the editorial points out, this practitioner also must keep apace with the many changes going on in his profession, particularly the "multitudinous discoveries of the pathologist, the bacteriologist, the physiologic chemist." As examples of new frontier discoveries, the editorial points to the novel side-chain theory of Ehrlich, forming the basis for a new field called immunology. It is, of course, says the editorial "mere theory and is somewhat tenuous." The recent scientific works of Morgenroth and Metschnikoff are also cited as a source to learn "a wholesome lesson in humility after grappling with these theories." The editorial concludes: "Would it not be well, perhaps, for him (ie, the practitioner) to devote some of his leisure to a little recreatory reading on this subject? It is true that all work and no play leads to an unhappy end, but the opposite condition is even more untimely."

A second editorial discusses the alarming public health menace of illuminating gas asphyxiation in the home. Some of these deaths are intentional (ie, suicide), but many, notes the editorial, are due to faulty heating fixtures or ignorance in their technical management. There is a need for an ordinance, states the editorial, to forbid the sale of gas fixtures which are below a certain safety standard. For this, an Inspector of Gas Piping and Fixtures may be needed. This inspector should be required to visit homes and provide verbal and printed information to its residents. Private physicians and school teachers may also be of great educational value in diminishing this public threat.

The principal paper, written by Frank E. Peckham, MD, describes the Lorenz Method – a new, bloodless procedure for treating children afflicted with congenital dislocation of the hip. The method consists of the following: The child is held firmly on its back while the leg is moved forcibly up and down to break up acetabular adhesions; the whole leg is now carried over into extreme flexion, the whole weight of the operator placed upon it. Next, the whole leg is strongly abducted, the thigh being held at an angle of 90 degrees with the pelvis; the adductor muscles, in the meantime, being ruptured by massage and by blows from the hand. The thigh is then strongly hyperextended. The child is held firmly on its back while the leg is very forcibly extended and thoroughly rotated. The child is again placed on its back, the buttocks slightly elevated, and a leather-covered wedge of wood is so placed that the edge comes just under the greater trochanter. The leg is again strongly abducted while the wedge pushes upward against the trochanter "until suddenly the head (of the femur) slips into the socket with a very noticeable jump and a loud click is heard." A plaster spica is then applied down to the knee – and left for 6 to 8 months. The spica is removed, the leg lowered 45 degrees and the plaster reapplied for 2 to 3 months. The child is then allowed to walk but at night a leather splint keeps the leg in the original extended position. The Lorenz treatment is not considered complete until at least 18 months have elapsed from the initial manipulation.

The blood in the malarial fevers is discussed by Henry A. Cooke, MD. The author begins by citing mortality statistics for New York, Brooklyn and Baltimore: in each of these urban sites the annual rates (per 100,000) for both malaria and typhoid range between 24 and 40. Many physicians, it is said, confuse the two disorders hedging their diagnoses with terms such as malarial typhoid or typhomalaria. "With the present knowledge of the etiology of both diseases . . . there is no excuse for such errors, and never for such looseness of terminology." Cooke summarizes, briefly, the 1880 publication of Laveran describing the malarial parasite associated with the red blood cell, but he also credits earlier observations of Virchow, Meckel and Rasori, the latter, in 1846, saying prophetically, "For many years I have held the opinion that the intermittent fevers are produced by parasites, which renew the paroxysm by the act of their reproduction, which occurs more or

less rapidly according to the variety of their species." The author then describes three forms of the protozoan organism producing, respectively, the tertian, quartan and aestivo-autumnal malarial fevers. The intra-erythrocytic cycles are carefully described, particular attention devoted to the appearances of the red cells as viewed with a microscope. The author then addresses the problem of how the malarial organism enters the human body. The role of the Anopheles mosquito is described and the latent interval – for each of the three organisms – is considered. The devastating anemia is noted. "The rapidity of loss of red cells is almost incredible. Three to 4 weeks of simple tertian fever may reduce them from 5 million to 1 million per cubic millimeter, and a severe aestivo-autumnal infection in a previously robust person may product the same result in 1 day. The diminution of hemoglobin follows closely the loss of red cells but during convalescence the red cells are renewed faster than the hemoglobin, as is usually true of secondary anemias."

### 50 Years Ago
### (March 1943)

The lead article describes Rhode Island's Cash Sickness Compensation Act and is written by Dr Herman C. Pitts. The author first summarizes the history of Rhode Island in its enlarging role in social and health care legislation. He notes, for example, that the control of the practice of medicine in this state dates back only to 1892. Prior to that date, anyone was allowed to practice medicine. "This whole movement for social betterment apparently stems from two sources. First, the gradual increase in comfortable living has made the more fortunate ones more alive to the struggles of those less fortunate. In other words the whole world has become more humanitarian and in becoming so, various schemes have been proposed to lighten the lot of the poorer part of the population. The second factor has been the increasing insistent cry of labor for a larger share of the fruits of its labors. And along with this demand for greater security in time of sickness and unemployment." A discussion of many recent plans and proposals (including new amendments to the Social Security Act, The California Plan, Blue Cross, and Blue Shield) compares and contrasts these various social measures. He concludes: "The medical profession never has been and never can be an 'organization in restraint of trade,' in spite of the court's ruling to the contrary. The best we can do, is to use our united influence in shaping future legislation so that some measure of the fine flavor of medical tradition will be left in the land."

John F. Kenney, MD, describes the treatment of pneumonia with large or immediate doses of sulfonamide. Six cases are thoroughly described. He concludes that blood level concentrations are no criterion as to complications such as anuria. The finding of crystals in the urine should not be an indication to discontinue the drug.

A clinical pathological conference analyzes the clinical course and pathological findings in a 78-year-old female with cholecystitis, cholelithiasis, duodenal fistula and gallstone ileus.

The lead editorial notes that the annual meetings of most national medical organizations have been canceled for 1943 because of the difficult transportation problems faced by the country in wartime. "The Rhode Island Medical Society will hold an annual meeting at the usual time this year. All members who are in better than tolerable physical health and who are not actually away on war missions should not fail to attend."

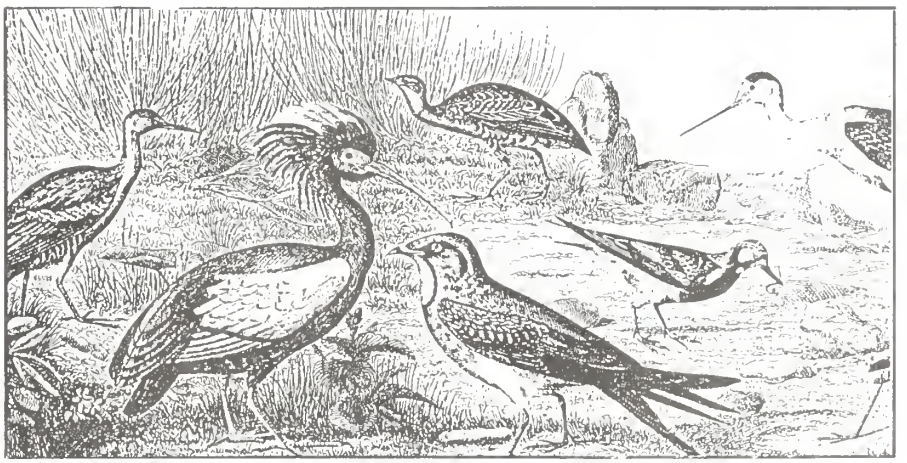
The second editorial describes the Rhode Island Hospital unit in India. The route traveled from the West Coast to India is not disclosed (for reasons of wartime security) except to state "that wherever they went they were in danger." The editorial further observes: "To be off the seas and on the solid earth of India is to have one of their gravest perils disposed of."

Miss Jessie Luther describes the beginnings of occupational therapy at Rhode Island Hospital, and its acceptance through the work of Dr John Peters who was superintendent of the hospital during the early decades of this century.

Some of the book reviews in this issue of the Journal were written by Professor J. Walter Wilson, the eminent biologist at Brown University. The Wilson Building (corner of Meeting and Angell Streets) was named in his honor.

### 25 Years Ago
### (March 1968)

Roswell Johnson, MD, for decades director of health services at Brown University, writes on the medical and social aspects of marijuana. After an extensive review of marijuana usage in Asia, Europe and the United States, the author discusses what is known (in 1968) about the pharmacology and addictive effects of this substance. The article also summarizes the provisions



within the various state laws pertaining to the transportation, sale and/or usage of marijuana. Johnson offers the following advice to students. "In our private consultations with students, as well as in the many group discussions we hold with them in their residential units, we present the most scientifically defensible material that we have available. When asked outright if we do or do not favor its use, we unequivocally state that we are unable to document any organic harm of any kind to the occasional experimenter, but that just as some people become habituated to cigarettes and others to alcohol or both, we feel that habituation to marijuana can develop. Habituation to alcohol or marijuana is incompatible with a productive college career. There is a clear-cut risk of panic, anxiety, paranoid reactions, and depression in some users. If this habituation becomes an obsessive principle of living and he feels that the life of a "pot-head" is better for him than the academic life, then he should probably follow the blandishments of people like Timothy Leary and drop out. Trying to lead the schizophrenic existence of dropping-out and dropping-in to classes is a highly unsatisfactory way of life."

Drs Dana Farnsworth and Henry Oliver of the Harvard University Health Services write about the significant medical risks entailed in the recreational use of LSD or marijuana.

Drs. James Yashar, Grady Hallman and Denton Cooley discuss the surgical treatment of pulmonary arteriovenous fistulas. The diagnosis is suggested by the presence of cyanosis, telangiectasia of skin and mucosa, clubbing of the digits, a continuous or systolic murmur over the lung and a round or lobulated density on chest x-ray. The diagnosis is verified by angiography.

Editorials discuss the growing problem of drug usage by college students, the association of viral hepatitis with narcotic addiction, the increasing problem of world malnutrition and population overgrowth, and a new beta adrenergic blocking agent called propanolol. A final editorial notes the wondrous surgical accomplishment in South Africa where a heart derived from a black was transplanted into a white patient. The editorial asks the innocent questions: "Is the new body black or white?" "Does the black heart in a white body emote black or white?" "Has the black heart become white?"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# "Being a patient advocate is what being a physician is all about."

Dr. Kevin Fullin, Cardiologist, Kenosha, Wisconsin, Member, American Medical Association

Why would a cardiologist get involved in the issue of family violence? Perhaps, because what he saw simply cried out for action.

"Fully a third of all women's injuries coming into our emergency rooms are no accident," says Dr. Fullin.

While others were content to downplay the issue of family violence, Dr. Fullin would not. He petitioned state officials, and through his efforts the first Domestic Violence Advocate Program in his state was created.

"Organized medicine must serve as an advocate for patients," stressed Dr. Fullin.

The American Medical Association (AMA) couldn't agree more. We're committed to focusing physician attention on the issue of family violence.

You are invited to join Dr. Fullin and to join with him in his efforts to bring quality health care to those in need. Become a member of the American Medical Association today.

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# Information for Contributors

**Manuscripts** - Manuscripts will be accepted for consideration with the understanding that they are original contributions, have never been published in its current form, and are submitted only to *Rhode Island Medicine*. An article should address a substantive issue of interest to the Rhode Island medical community. Articles may be no more than 3000 words in length and have no more than 20 references.

**Specifications**: Manuscripts should be typewritten on one side of the paper only, with double spacing and liberal margins, using 8½" x 11" non-erasable bond. Tables, charts, and legends should be submitted separately from the text and referred to by number (eg, Fig. 1 or Table 2, etc.) Number pages consecutively.

To expedite production and ensure accuracy, authors are **strongly encouraged** to submit articles as well as computer-generated tables and figures on floppy diskette, formatted in any major MS-DOS or Windows word processor (eg, Microsoft Word, Wordperfect, Wordstar, Xywrite, Multimate, etc.) Macintosh disks will be accepted provided text is saved in an ASCII file. If possible, Macintosh disks should be saved in DOS format, using Apple File Exchange. Diskettes must be accompanied with at least one printed copy of the manuscript. Diskettes will be returned upon request.

**Title page:** The first page of the manuscript should contain: (1) title of the contribution; (2) authors' name(s), highest academic degree, and institution; (3) address and phone number for communications; (4) a brief biographical description of each author, including specialty, practice location, academic appointment and hospital affiliation.

**Abbreviations**: Avoid the use of jargon and unnecessary abbreviations. Abbreviations used, especially of laboratory and diagnostic procedures, must be identified fully in the text within parentheses. The author(s) shall provide *Rhode Island Medicine* with a complete alphabetic list of such abbreviations with an explanation for each, on a separate page.

**References**: References shall be limited to those that are absolutely essential to the understanding of the article and should number no more than 20. The editor reserves the right to reduce the number when necessary. The author is responsible for the accuracy and completeness of the references. References should be compiled at the end of the article according to the order of citation in the text. In the text, they should be given as numerical superscripts. They should be typewritten, double-spaced under the heading "References." A complete journal reference includes: (1) authors' surnames and initials; (2) title of article and subtitle, if any; (3) abbreviated name of journal (abbreviations must conform to those used in the *Index Medicus*); (4) year; (5) volume number; (6) part or supplement number, when pertinent, and issue month or number when pagination is not consecutive throughout a volume; and (7) inclusive page numbers. A complete book reference includes (1) authors' surnames and initials; (2) surname and initials of editor or translator, or both, if any; (3) title of book and subtitle, if any; (4) number of editions after the first; (5) place of publication; (6) name of publisher; (7) year of publication; (8) volume number, if more than one; and (9) page numbers, if specific pages are cited. References should conform to the punctuation and style set forth in the American Medical Association's *Manual of Style,* 8th ed.:

**Journal Article:**

1. Feinfeld DA, al-Achkar G, Lipner HI, Chirayil SJ, Hakim J, Avram MM. Syndrome of inappropriate secretion of antidiuretic hormone: Association with cavernous sinus thrombosis. *JAMA.* 1978;240:856-857.

**Books:**

2. Hollingworth JW. *Local and Systemic Complications of Rheumatoid Arthritis.* Philadelphia, Pa: Saunders; 1968.

**Book Chapter**

3. Epstein WL. Erythema nodosum. In: Samter M, ed. *Immunological Diseases*, 2nd ed. Boston, Mass.: Little, Brown; 1971;2:944-951.

**Illustrations** - Drawings and charts must be submitted in black ink on white paper. Laser printed graphs are acceptable provided they are printed at 300 DPI resolution. Photographs must be in black and white, submitted on 5 x 7 glossy paper. Illustrations must be numbered consecutively and their positions indicated in the text. The figure number, indication of the top, and the name of the author must be attached to the back of each illustration. Legends should be submitted in a single list with the numbers corresponding to those on the illustrations. Recognizable photographs of patients are to be appropriately masked and must carry with them written permission for publication. Special arrangments must be made with the editors for excessive numbers of illustrations. Color plates are not acceptable.

**Identification of Patients** - Names and initials should not be used. When discussing individual patients use numbers (ie, Patient 1, Patient 2, etc.).

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**PRAVACHOL® (Pravastatin Sodium Tablets)**

## CONTRAINDICATIONS

Hypersensitivity to any component of this medication.

Active liver disease or unexplained, persistent elevations in liver function tests (see WARNINGS).

*Pregnancy and lactation.* Atherosclerosis is a chronic process and discontinuation of lipid-lowering drugs during pregnancy should have little impact on the outcome of long-term therapy of primary hypercholesterolemia. Cholesterol and other products of cholesterol biosynthesis are essential components for fetal development (including synthesis of steroids and cell membranes). Since HMG-CoA reductase inhibitors decrease cholesterol synthesis and possibly the synthesis of other biologically active substances derived from cholesterol, they may cause fetal harm when administered to pregnant women. Therefore, HMG-CoA reductase inhibitors are contraindicated during pregnancy and in nursing mothers. **Pravastatin should be administered to women of childbearing age only when such patients are highly unlikely to conceive and have been informed of the potential hazards.** If the patient becomes pregnant while taking this class of drug, therapy should be discontinued and the patient apprised of the potential hazard to the fetus.

## WARNINGS

**Liver Enzymes:** HMG-CoA reductase inhibitors, like some other lipid-lowering therapies, have been associated with biochemical abnormalities of liver function. Increases of serum transaminase (ALT, AST) values to more than 3 times the upper limit of normal occurring on 2 or more (not necessarily sequential) occasions have been reported in 1.3% of patients treated with pravastatin in the U.S. over an average period of 18 months. These abnormalities were not associated with cholestasis and did not appear to be related to treatment duration. In those patients in whom these abnormalities were believed to be related to pravastatin and who were discontinued from therapy, the transaminase levels usually fell slowly to pretreatment levels. These biochemical findings are usually asymptomatic although worldwide experience indicates that anorexia, weakness, and/or abdominal pain may also be present in rare patients.

As with other lipid-lowering agents, liver function tests should be performed during therapy with pravastatin. Serum aminotransferases, including ALT (SGPT), should be monitored before treatment begins, every six weeks for the first three months, every eight weeks during the remainder of the first year, and periodically thereafter (e.g., at about six-month intervals). Special attention should be given to patients who develop increased transaminase levels. Liver function tests should be repeated to confirm an elevation and subsequently monitored at more frequent intervals. If increases in AST and ALT equal or exceed three times the upper limit of normal and persist, then therapy should be discontinued. Persistence of significant aminotransferase elevations following discontinuation of therapy may warrant consideration of liver biopsy.

Active liver disease or unexplained transaminase elevations are contraindications to the use of pravastatin (see CONTRAINDICATIONS). Caution should be exercised when pravastatin is administered to patients with a history of liver disease or heavy alcohol ingestion (see CLINICAL PHARMACOLOGY, Pharmacokinetics/Metabolism). Such patients should be closely monitored, started at the lower end of the recommended dosing range, and titrated to the desired therapeutic effect.

**Skeletal Muscle: Rhabdomyolysis with renal dysfunction secondary to myoglobinuria has been reported with pravastatin and other drugs in this class.** Uncomplicated myalgia has also been reported in pravastatin-treated patients (see ADVERSE REACTIONS). Myopathy, defined as muscle aching or muscle weakness in conjunction with increases in creatine phosphokinase (CPK) values to greater than 10 times the upper limit of normal was reported to be possibly due to pravastatin in only one patient in clinical trials (<0.1%). Myopathy should be considered in any patient with diffuse myalgias, muscle tenderness or weakness, and/or marked elevation of CPK. Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever. **Pravastatin therapy should be discontinued if markedly elevated CPK levels occur or myopathy is diagnosed or suspected. Pravastatin therapy should also be temporarily withheld in any patient experiencing an acute or serious condition predisposing to the development of renal failure secondary to rhabdomyolysis, e.g., sepsis; hypotension; major surgery; trauma; severe metabolic, endocrine, or electrolyte disorders; or uncontrolled epilepsy.**

The risk of myopathy during treatment with lovastatin is increased if therapy with either cyclosporine, gemfibrozil, erythromycin, or niacin is administered concurrently. There is no experience with the use of pravastatin together with cyclosporine. Myopathy has not been observed in clinical trials involving small numbers of patients who were treated with pravastatin together with niacin. One trial of limited size involving combined therapy with pravastatin and gemfibrozil showed a trend toward more frequent CPK elevations and patient withdrawals due to musculoskeletal symptoms in the group receiving combined treatment as compared with the groups receiving placebo, gemfibrozil, or pravastatin monotherapy. Myopathy was not reported in this trial (see PRECAUTIONS, Drug Interactions). One patient developed myopathy when clofibrate was added to a previously well tolerated regimen of pravastatin; the myopathy resolved when clofibrate therapy was stopped and pravastatin treatment continued. **The use of fibrates alone may occasionally be associated with myopathy. The combined use of pravastatin and fibrates should generally be avoided.**

## PRECAUTIONS

**General:** Pravastatin may elevate creatine phosphokinase and transaminase levels (see ADVERSE REACTIONS). This should be considered in the differential diagnosis of chest pain in a patient on therapy with pravastatin.

*Homozygous Familial Hypercholesterolemia.* Pravastatin has not been evaluated in patients with rare homozygous familial hypercholesterolemia. In this group of patients, it has been reported that HMG-CoA reductase inhibitors are less effective because the patients lack functional LDL receptors.

*Renal Insufficiency.* A single 20 mg oral dose of pravastatin was administered to 24 patients with varying degrees of renal impairment (as determined by creatinine clearance). No effect was observed on the pharmacokinetics of pravastatin or its 3α-hydroxy isomeric metabolite (SQ 31,906). A small increase was seen in mean AUC values and half-life ($t_{1/2}$) for the inactive enzymatic ring hydroxylation metabolite (SQ 31,945). Given this small sample size, the dosage administered, and the degree of individual variability, patients with renal impairment who are receiving pravastatin should be closely monitored.

**Information for Patients:** Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever.

**Drug Interactions:** *Immunosuppressive Drugs, Gemfibrozil, Niacin (Nicotinic Acid), Erythromycin.* See WARNINGS, Skeletal Muscle.

*Antipyrine.* Clearance by the cytochrome P450 system was unaltered by concomitant administration of pravastatin. Since pravastatin does not appear to induce hepatic drug-metabolizing enzymes, it is not expected that any significant interaction of pravastatin with other drugs (e.g., phenytoin, quinidine) metabolized by the cytochrome P450 system will occur.

*Cholestyramine/Colestipol.* Concomitant administration resulted in an approximately 40 to 50% decrease in the mean AUC of pravastatin. However, when pravastatin was administered 1 hour before or 4 hours after cholestyramine or 1 hour before colestipol and a standard meal, there was no clinically significant decrease in bioavailability or therapeutic effect. (See DOSAGE AND ADMINISTRATION, Concomitant Therapy.)

*Warfarin.* In a study involving 10 healthy male subjects given pravastatin and warfarin concomitantly for 6 days, bioavailability parameters at steady state for pravastatin (parent compound) were not altered. Pravastatin did not alter the plasma protein-binding of warfarin. Concomitant dosing did increase the AUC and Cmax of warfarin but did not produce any changes in its anticoagulant action (i.e., no increase was seen in mean prothrombin time after 6 days of concomitant therapy). However, bleeding and extreme prolongation of prothrombin time has been reported with another drug in this class. Patients receiving warfarin-type anticoagulants should have their prothrombin times closely monitored when pravastatin is initiated or the dosage of pravastatin is changed.

*Cimetidine.* The $AUC_{0-12hr}$ for pravastatin when given with cimetidine was not significantly different from the AUC for pravastatin when given alone. A significant difference was observed between the AUC's for pravastatin when given with cimetidine compared to when administered with antacid.

*Digoxin.* In a crossover trial involving 18 healthy male subjects given pravastatin and digoxin concurrently for 9 days, the bioavailability parameters of digoxin were not affected. The AUC of pravastatin tended to increase, but the overall bioavailability of pravastatin plus its metabolites SQ 31,906 and SQ 31,945 was not altered.

*Gemfibrozil.* In a crossover study in 20 healthy male volunteers given concomitant single doses of pravastatin and gemfibrozil, there was a significant decrease in urinary excretion and protein binding of pravastatin. In addition, there was a significant increase in AUC, Cmax, and Tmax for the pravastatin metabolite SQ 31,906. Combination therapy with pravastatin and gemfibrozil is generally not recommended.

In interaction studies with *aspirin, antacids* (1 hour prior to PRAVACHOL), *cimetidine, nicotinic acid,* or *probucol,* no statistically significant differences in bioavailability were seen when PRAVACHOL (pravastatin sodium) was administered.

*Other Drugs.* During clinical trials, no noticeable drug interactions were reported when PRAVACHOL was added to diuretics, antihypertensives, digitalis, converting-enzyme inhibitors, calcium channel blockers, beta-blockers, or nitroglycerin.

**Endocrine Function:** HMG-CoA reductase inhibitors interfere with cholesterol synthesis and lower circulating cholesterol levels and, as such, might theoretically blunt adrenal or gonadal steroid hormone production. Results of clinical trials with pravastatin in males and post-menopausal females were inconsistent with regard to possible effects of the drug on basal steroid hormone levels. In a study of 21 males, the mean testosterone response to human chorionic gonadotropin was significantly reduced ($p<0.004$) after 16 weeks of treatment with 40 mg of pravastatin. However, the percentage of patients showing a ≥50% rise in plasma testosterone after human chorionic gonadotropin stimulation did not change significantly after therapy in these patients. The effects of HMG-CoA reductase inhibitors on spermatogenesis and fertility have not been studied in adequate numbers of patients. The effects, if any, of pravastatin on the pituitary-gonadal axis in pre-menopausal females are unknown. Patients treated with pravastatin who display clinical evidence of endocrine dysfunction should be evaluated appropriately. Caution should also be exercised if an HMG-CoA reductase inhibitor or other agent used to lower cholesterol levels is administered to patients also receiving other drugs (e.g., ketoconazole, spironolactone, cimetidine) that may diminish the levels or activity of steroid hormones.

**CNS Toxicity:** CNS vascular lesions, characterized by perivascular hemorrhage and edema and mononuclear cell infiltration of perivascular spaces, were seen in dogs treated with pravastatin at a dose of 25 mg/kg/day, a dose that produced a plasma drug level about 50 times higher than the mean drug level in humans taking 40 mg/day. Similar CNS vascular lesions have been observed with several other drugs in this class.

A chemically similar drug in this class produced optic nerve degeneration (Wallerian degeneration of retinogeniculate fibers) in clinically normal dogs in a dose-dependent fashion starting at 60 mg/kg/day, a dose that produced mean plasma drug levels about 30 times higher than the mean drug level in humans taking the highest recommended dose (as measured by total enzyme inhibitory activity). This same drug also produced vestibulocochlear Wallerian-like degeneration and retinal ganglion cell chromatolysis in dogs treated for 14 weeks at 180 mg/kg/day, a dose which resulted in a mean plasma drug level similar to that seen with the 60 mg/kg dose.

**Carcinogenesis, Mutagenesis, Impairment of Fertility:** In a 2-year study in rats fed pravastatin at doses of 10, 30, or 100 mg/kg body weight, there was an increased incidence of hepatocellular carcinomas in males at the highest dose ($p<0.01$). Although rats were given up to 125 times the human dose (HD) on a mg/kg body weight basis, their serum drug levels were only 6 to 10 times higher than those measured in humans given 40 mg pravastatin as measured by AUC.

The oral administration of 10, 30, or 100 mg/kg (producing plasma drug levels approximately 0.5 to 5.0 times human drug levels at 40 mg) of pravastatin to mice for 22 months resulted in a statistically significant increase in the incidence of malignant lymphomas in treated females when all treatment groups were pooled and compared to controls ($p<0.05$). The incidence was not dose-related and male mice were not affected.

A chemically similar drug in this class was administered to mice for 72 weeks at 25, 100, and 400 mg/kg body weight, which resulted in mean serum drug levels approximately 3, 15, and 33 times higher than the mean human serum drug concentration (as total inhibitory activity) after a 40 mg oral dose. Liver carcinomas were significantly increased in high-dose females and mid- and high-dose males, with a maximum incidence of 90 percent in males. The incidence of adenomas of the liver was significantly increased in mid- and high-dose females. Drug treatment also significantly increased the incidence of lung adenomas in mid- and high-dose males and females. Adenomas of the eye Harderian gland (a gland of the eye of rodents) were significantly higher in high-dose mice than in controls.

No evidence of mutagenicity was observed *in vitro*, with or without rat-liver metabolic activation, in the following studies: microbial mutagen tests, using mutant strains of *Salmonella typhimurium* or *Escherichia coli*; a forward mutation assay in L5178Y TK +/− mouse lymphoma cells; a chromosomal aberration test in hamster cells; and a gene conversion assay using *Saccharomyces cerevisiae*. In addition, there was no evidence of mutagenicity in either a dominant lethal test in mice or a micronucleus test in mice.

In a study in rats, with daily doses up to 500 mg/kg, pravastatin did not produce any adverse effects on fertility or general reproductive performance. However, in a study with another HMG-CoA reductase inhibitor, there was decreased fertility in male rats treated for 34 weeks at 25 mg/kg body weight, although this effect was not observed in a subsequent fertility study when this same dose was administered for 11 weeks (the entire cycle of spermatogenesis, including epididymal maturation). In rats treated with this same reductase inhibitor at 180 mg/kg/day, seminiferous tubule degeneration (necrosis and loss of spermatogenic epithelium) was observed. Although not seen with pravastatin, two similar drugs in this class caused drug-related testicular atrophy, decreased spermatogenesis, spermatocytic degeneration, and giant cell formation in dogs. The clinical significance of these findings is unclear.

**Pregnancy: Pregnancy Category X:** See CONTRAINDICATIONS.

Safety in pregnant women has not been established. Pravastatin was not teratogenic in rats at doses up to 1000 mg/kg daily or in rabbits at doses of up to 50 mg/kg daily. These doses resulted in 20x (rabbit) or 240x (rat) the human exposure based on surface area (mg/meter$^2$). However, in studies with another HMG-CoA reductase inhibitor, skeletal malformations were observed in rats and mice. PRAVACHOL (pravastatin sodium) should be administered to women of child-bearing potential only when such patients are highly unlikely to conceive and have been informed of the potential hazards. If the woman becomes pregnant while taking PRAVACHOL (pravastatin sodium), it should be discontinued and the patient advised again as to the potential hazards to the fetus.

**Nursing Mothers:** A small amount of pravastatin is excreted in human breast milk. Because of the potential for serious adverse reactions in nursing infants, women taking PRAVACHOL should not nurse (see CONTRAINDICATIONS).

**Pediatric Use:** Safety and effectiveness in individuals less than 18 years old have not been established. Hence, treatment in patients less than 18 years old is not recommended at this time. (See also PRECAUTIONS: **General**.)

## ADVERSE REACTIONS

Pravastatin is generally well tolerated; adverse reactions have usually been mild and transient. In 4-month long placebo-controlled trials, 1.7% of pravastatin-treated patients and 1.2% of placebo-treated patients were discontinued from treatment because of adverse experiences attributed to study drug therapy; this difference was not statistically significant. In long-term studies, the most common reasons for discontinuation were asymptomatic serum transaminase increases and mild, non-specific gastrointestinal complaints. During clinical trials the overall incidence of adverse events in the elderly was not different from the incidence observed in younger patients.

**Adverse Clinical Events:** All adverse clinical events (regardless of attribution) reported in more than 2% of pravastatin-treated patients in the placebo-controlled trials are identified in the table below; also shown are the percentages of patients in whom these medical events were believed to be related or possibly related to the drug.

| | All Events % | | Events Attributed to Study Drug % | |
|---|---|---|---|---|
| Body System/Event | Pravastatin (N = 900) | Placebo (N = 411) | Pravastatin (N = 900) | Placebo (N = 411) |
| Cardiovascular | | | | |
| Cardiac Chest Pain | 4.0 | 3.4 | 0.1 | 0.0 |
| Dermatologic | | | | |
| Rash | 4.0* | 1.1 | 1.3 | 0.9 |
| Gastrointestinal | | | | |
| Nausea/Vomiting | 7.3 | 7.1 | 2.9 | 3.4 |
| Diarrhea | 6.2 | 5.6 | 2.0 | 1.9 |
| Abdominal Pain | 5.4 | 6.9 | 2.0 | 3.9 |
| Constipation | 4.0 | 7.1 | 2.4 | 5.1 |
| Flatulence | 3.3 | 3.6 | 2.7 | 3.4 |
| Heartburn | 2.9 | 1.9 | 2.0 | 0.7 |
| General | | | | |
| Fatigue | 3.8 | 3.4 | 1.9 | 1.0 |
| Chest Pain | 3.7 | 1.9 | 0.3 | 0.2 |
| Influenza | 2.4* | 0.7 | 0.0 | 0.0 |
| Musculoskeletal | | | | |
| Localized Pain | 10.0 | 9.0 | 1.4 | 1.5 |
| Myalgia | 2.7 | 1.0 | 0.6 | 0.0 |
| Nervous System | | | | |
| Headache | 6.2 | 3.9 | 1.7* | 0.2 |
| Dizziness | 3.3 | 3.2 | 1.0 | 0.5 |
| Renal/Genitourinary | | | | |
| Urinary Abnormality | 2.4 | 2.9 | 0.7 | 1.2 |
| Respiratory | | | | |
| Common Cold | 7.0 | 6.3 | 0.0 | 0.0 |
| Rhinitis | 4.0 | 4.1 | 0.1 | 0.0 |
| Cough | 2.6 | 1.7 | 0.1 | 0.0 |

*Statistically significantly different from placebo.

The following effects have been reported with drugs in this class:

*Skeletal:* myopathy, rhabdomyolysis.

*Neurological:* dysfunction of certain cranial nerves (including alteration of taste, impairment of extra-ocular movement, facial paresis), tremor, vertigo, memory loss, paresthesia, peripheral neuropathy, peripheral nerve palsy.

*Hypersensitivity Reactions:* An apparent hypersensitivity syndrome has been reported rarely which has included one or more of the following features: anaphylaxis, angioedema, lupus erythematous-like syndrome, polymyalgia rheumatica, vasculitis, purpura, thrombocytopenia, leukopenia, hemolytic anemia, positive ANA, ESR increase, arthritis, arthralgia, urticaria, asthenia, photosensitivity, fever, chills, flushing, malaise, dyspnea, toxic epidermal necrolysis, erythema multiforme, including Stevens-Johnson syndrome.

*Gastrointestinal:* pancreatitis, hepatitis, including chronic active hepatitis, cholestatic jaundice, fatty change in liver, and, rarely, cirrhosis, fulminant hepatic necrosis, and hepatoma, anorexia, vomiting.

*Reproductive:* gynecomastia, loss of libido, erectile dysfunction.

*Eye:* progression of cataracts (lens opacities), ophthalmoplegia.

**Laboratory Test Abnormalities:** Increases in serum transaminase (ALT, AST) values and CPK have been observed (see WARNINGS).

Transient, asymptomatic eosinophilia has been reported. Eosinophil counts usually returned to normal despite continued therapy. Anemia, thrombocytopenia, and leukopenia have been reported with other HMG-CoA reductase inhibitors.

**Concomitant Therapy:** Pravastatin has been administered concurrently with cholestyramine, colestipol, nicotinic acid, probucol and gemfibrozil. Preliminary data suggest that the addition of either probucol or gemfibrozil to therapy with lovastatin or pravastatin is **not** associated with greater reduction in LDL-cholesterol than that achieved with lovastatin or pravastatin alone. No adverse reactions unique to the combination or in addition to those previously reported for each drug alone have been reported. Myopathy and rhabdomyolysis (with or without acute renal failure) have been reported when another HMG-CoA reductase inhibitor was used in combination with immunosuppressive drugs, gemfibrozil, erythromycin, or lipid-lowering doses of nicotinic acid. Concomitant therapy with HMG-CoA reductase inhibitors and these agents is generally not recommended. (See WARNINGS, **Skeletal Muscle** and PRECAUTIONS, **Drug Interactions.**)

## OVERDOSAGE

There have been no reports of overdoses with pravastatin.

Should an accidental overdose occur, treat symptomatically and institute supportive measures as required.

(J4-422A)

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Issued September 1992

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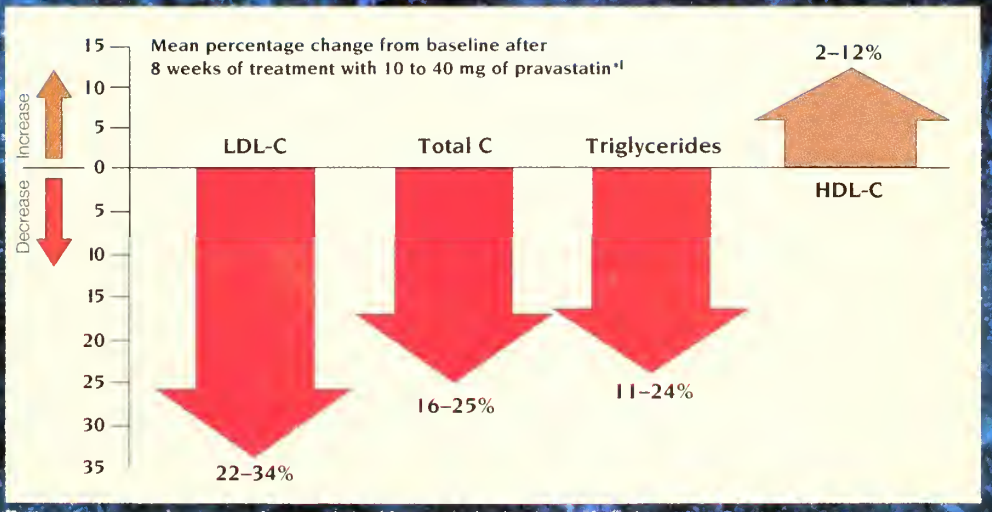
# Effective cholesterol control

## Consistently and significantly reduces total C and atherogenic LDL-C; positively affects other key lipids




*Each arrow represents a range of means derived from a single placebo-controlled study that included 55 patients treated with pravastatin.

PRAVACHOL® (pravastatin sodium) is indicated as an adjunct to diet for the reduction of elevated total and LDL-cholesterol levels in patients with primary hypercholesterolemia (Types IIa and IIb) when the response to diet alone has not been adequate.

Active liver disease *or* unexplained transaminase elevations, pregnancy and lactation are contraindications to the use of pravastatin.

**Reference: 1.** Jones PH, et al. Once-daily pravastatin in patients with primary hypercholesterolemia: a dose-response study. *Clin Cardiol* 1991;14:146-151.

# PRAVACHOL™

## pravastatin sodium 20 mg tablets

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Publication of the Rhode Island Medical Society



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**Cover:** The waiting room of the Capitol Hill Health Center, Providence Ambulatory Health Care Foundation, Inc.

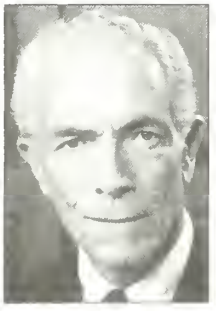

**Rhode Island Medicine** is owned and published monthly by the Rhode Island Medical Society, 106 Francis Street, Providence, Rhode Island 02903, Ph: 401-331-3207. Single copies $4.00 — Subscriptions $40.00 per year (members of the Rhode Island Medical Society — $5.00 annually). Published articles represent opinions of the authors and do not necessarily reflect the official policy of the Rhode Island Medical Society unless clearly specified. Advertisements do not imply sponsorship or endorsement by the Rhode Island Medical Society. Second class postage paid at Providence, Rhode Island. **ISSN 1061-222X.** POSTMASTER: Send address changes to RHODE ISLAND MEDICINE, 106 Francis Street, Providence, RI 02903. Advertising Representative: Narragansett Graphics, 9 Marriot Avenue, Westerly, Rhode Island 0289. Phone: (401)596-0117. FAX: (401) 596-7799 National Advertising Bureau: State Medical Journal Advertising Bureau, Inc., 711 South Blvd., Oak Park, Illinois 60302. Phone 708-383-8800.

# PREFACE

## Quality Care to Our Neediest Citizens

**Sen. Claiborne Pell**

For 25 years, Rhode Island's community health centers, and in particular, the Providence Ambulatory Health Care Foundation, Inc., have provided quality medical care to our state's neediest citizens. I am very pleased to join you in celebrating the important contribution that these centers have made to the health and well-being of so many Rhode Islanders.



I think of our state's neighborhood health centers with great pride. As a young Senator from Rhode Island, I was actively involved in securing the initial funding for the establishment of Rhode Island's community health centers and sat then, as I do now, on the Senate committee that has jurisdiction over these centers nationwide. Today, there are more than 550 clinics at 1400 delivery sites throughout the nation, serving almost 6 million Americans annually. In Rhode Island alone, 14 clinics at 23 sites served about 60,000 people in 1992.

When Congress created the nation's community health centers, it did so in large measure to help address the health care needs of our most vulnerable citizens. In Rhode Island, which has no public "city" hospitals or health department clinics for direct primary care services, these centers have filled a serious gap by providing services to many in need, including those who experience financial, language or cultural barriers to medical care. The Providence Ambulatory Health Care Foundation, Inc., which operates five community health centers in inner-city Providence and is our state's largest center, serves as the main source of primary care for many of Rhode Island's poor and non-English speaking citizens.

Community health centers have greatly enhanced both the health of many of our citizens and the public health by preventing epidemics of communicable diseases through active immunization programs, screening and detection of tuberculosis, and the diagnosis and early treatment of a variety of infectious diseases.

Because of their vital role, it is particularly unfortunate that the nation's community health centers have suffered over the last decade from a serious lack of federal funding and attention. I have had the opportunity to discuss our neighborhood health centers with Secretary of Health and Human Services Donna Shalala. I was very impressed with her knowledge of the plight of our community health centers and the important role they play in our health care system.

I would be remiss in recounting the history and importance of community health centers if I did not mention what I believe has made these centers a successful and crucial part of the nation's health care system: the dedicated professionals who staff them.

While private practice has its rewards, caring for the nation's least healthy and least fortunate citizens is as selfless as it is rewarding. To all those doctors, nurses, and other professionals who have devoted their time, energy, and talents to serving in our nation's community health centers, I would like to say "thank you" on behalf of myself, the people of Rhode Island, and all those who have received the quality medical care we have come to know.

## A Quarter Century of Service

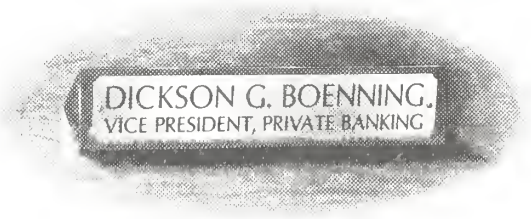
**Sen. John H. Chafee**

It is with great enthusiasm that I join Rhode Islanders in celebrating the quarter century of service by our community health centers. The five Rhode Island health centers operated by the Providence Ambulatory Health Care Foundation play a significant and meaningful role in the delivery of quality health care services in Rhode Island and have done a magnificent job in carrying out their mission.

Were it not for these critical centers, many of our citizens most in need would have had little or no access to health care. Indeed, there are health centers in our state that are often the only source of care for uninsured Rhode Islanders. Last year, patients made more than 60,000 visits to the centers' dedicated physicians and nurse practitioners. These centers also provide a wide range of preventive services to improve the health of many Rhode Island families.

As we continue our efforts to reform our health care system, it is important that we look at the vital contributions of our community health centers during the past 25 years. The medical community should be proud of their achievements.

I congratulate The Providence Ambulatory Health Care Foundation and its dedicated staff for a splendid job in serving our citizens and our community.

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# COMMENTARIES

## The Providence Health Centers: 25 Years of Inner-City Service

If cities functioned primarily as sites where shared services could be concentrated, we would have little reason to comment on their health problems. The state of health in the inner city then would be essentially the same as in the outer city, the suburbs or the rural regions.

But things are otherwise: despite the claims of urban planners, few cities are either uniformly healthy or rationally designed. An occasional capital center or a spacious shopping mall may be a jewel of prospective planning, but beyond the proud boulevards and the verdant parks one inevitably finds ghettos displacing the older neighborhoods.

A plan for a proud hilltop city may succeed for a while, but market forces are never idle and yesterday's urgent economic needs are tomorrow's hula hoops. Inevitably, some industries will prosper and some will languish. The cyclically unemployed (as well as the migrants, the new immigrants and others with limited resources) will seek out affordable, accessible housing often in the older, interior sections of the city; by their increasing presence they will redefine a neighborhood as inner city. Both the dwellings (which are old, crowded and deteriorating) and the dwellers (who are at, near, or below the poverty level) are now even more vulnerable to the stresses of squalid living. Their health problems result from chronically poor care, inadequate resources, meager education and the secondary effects of poverty: the specters of addiction, domestic abuse, indifferent health behavior and despair.

This month's issue of *Rhode Island Medicine* seeks to accomplish two tasks: to provide the readership with a description of those health care problems more common to the inner cities; and, on its 25th anniversary, to honor the Providence Ambulatory Health Centers, which, for a quarter of a century, has striven to diminish these medical and social problems. Recognition also must be given to those physicians in the past, particularly Roswell Johnson, MD, who provided the initial leadership for this important urban resource.

Messages from Senators Pell and Chafee, in this issue of the journal, pay particular honor to Dr Stanley H. Block and his administrative and health care staff for their many notable successes in reversing some of the stubborn medical problems plaguing the inner cities of Rhode Island.

## The Book of Miracles

In January, Sears, Roebuck and Company ceased publishing its annual catalog. Sears freely distributed this wondrous compendium for 97 years to all believers who had but to reach into its pages in order to bring miracles to their doorsteps. The catalog listed thousands of items from massive farm implements to pharmaceuticals to gold watches. (Richard Sears had entered the modest business of selling watches by mail-order in 1886. He expanded to the servicing of time-pieces a few years later when he recruited a young watch repairman named Alvah Roebuck. Only then did they diversify their business to other products.)

By the turn of this century, the Sears catalog had matured into something more than a mere inventory of goods for sale. It had become the second most widely read text in the nation, in most homes sharing mantlespace with the Bible. The two volumes, the Good Book and the Big Book, defined the world for much of the country, particularly middle America. The catalog established itself as the archive of gathered hopes and accessible miracles; it created standards and priorities for a developing middle class; and it sanctioned the material dreams of a new and credulous America. Many of the catalog users were recent immigrants; accordingly, Sears provided shopping instructions in English, German and Swedish.

Summarized below are some of the medically related items appearing in the 1906 edition. When browsing through this illustrated encyclopedia, one encounters, for example, a pocket watch for sale, of Swiss manufacture, gold-filled and manufactured expressly for the gentleman physician. It has a second hand to measure the pulse rate, a separate dial to indicate the day of the month, and it sells for but $2.98. A triple-stranded, gold-filled vest chain to hold this elegant watch costs $4.30.

The pharmaceutical section offers cures for virtually all of the common ailments, at prices that seem to be reasonable until one considers that the average weekly wage was then under $9. Dr. Wilden's Stomach Remedy, as an illustration, guarantees rapid relief from indigestion, difficulty in breathing or chest pain at 35 cents per box of tablets. Each tablet is said to contain sodium bicarbonate, rhubarb, gentian, capsicum, ipecac, pancreatin and willow charcoal. Brown's Cure for Female Weakness (defined as languor, kidney pains, low back aches, irregular courses, and timid, restless or nervous feelings) consists of an alcoholic mixture of partridge berry, helonias

root, blue cohosh, black haw, and podophyllum. Dr. Echol's Heart Cure specifically addresses such clinical problems as shortness of breath, palpitations, fainting, spells of other types and an inability to sleep on one's left side. The remedy (at 39 cents a box) includes the following agents: extracts of cactus, digitalis, caffeine and iron pyrophosphate. Vin Vitae, the wine of life at 64 cents per bottle, is urgently described as a tonic stimulant and "a strengthener for the weak, an effective and agreeable food for the blood, brain and nerves." It also serves to cure exhaustion, sleeplessness, poor circulation, and those ills peculiar to women. Its two principal ingredients are proudly and prominently listed as alcohol and coca leaves. The ad hastens to say that if the user does not experience renewed energy, soothed nerves and improved digestion, after a trial interval, he or she may return the bottle for a full refund.

The infamous Celery Malt Tonic is offered for sale (52 cents per bottle) for the relief of insomnia, helplessness, mental exhaustion (the result, according to the label, of close confinement or sedentary habits), loss of appetite or impoverished blood. It contains celery seed extract, cinchona, senna, and coca leaves in alcohol.

Dr. Hammond's Nerve and Brain Tablets (55 cents per box) offer much more than the customary cure for all forms of nervous system disturbances. The tablets also provide a stimulating benefit that will restore "vital force and revitalize the weakened sexual organism" for asthenic males while at the same time strengthening the heart action. This modest elixir of vitality contains the following ingredients: ferric sulfate, potassium carbonate, asafetida, damiana, aloin, zinc phosphide, and nux vomica. (Damiana, an herbal component, was said to be an aphrodisiac. Nux vomica is a seed extract from trees of the Loganiaceae family and contains two active alkaloids, strychnine and brucine.)

Dr Rose's Arsenous Complexion Tabules guarantee a perfect complexion by driving out impurities of the blood, banishing unnatural oiliness, and thus resulting in a skin of transparent texture, free of blemish. Dr Worden's Female Pills are said to be specific for headache, nausea, weakness and depression that are "the direct result of a derangement of the delicate female organism and nature's regular functions known as female trouble." At 33 cents a box, these pills contain extract of squaw vine, ferrous sulfate, potassium carbonate, sumbul, helonias, asafetida, gentian and viburnum. Dr Barker's Blood Builder, for both sexes, contains stillingia, burdock, blue flag, eider flowers, pipsissewa, sugar, and unidentified aromatics all dissolved in alcohol. (Pipsissewa is a mildly diuretic herb.) It has been said that the desire to take medicine is perhaps the greatest feature that distinguishes humans from animals.

The various soaps, depilatories and hair restorers decline to share their contents with the catalog reader; nor does the Princess Bust Cream and Food tell the public its secret ingredients. Success, however, is assured for "making a plump, full, rounded bosom, perfect neck and arms, a smooth skin, which before was scrawny, flat and flabby." There are additional pages filled with advertisements for smelling salts (15 cents a bottle), almond meal (a genuine Oriental emollient), milk of roses, genuine juice of lily bulbs, creme de marshmallow (for the inflamed skin), milk of cucumber and Mme. Qui Vive Complexion Powder.

This book of miracles also offers various physical contrivances that aid the crippled, correct the myopic, cure the ruptured, and allow the deaf to hear again.

In the 1990s, when skepticism is the principal currency of the marketplace, these breathlessly disingenuous advertisements likely would reduce a street corner charlatan to shame. The audacious claims are mildly amusing in 1993 but were monstrously deceptive at the start of this century. Not a word is ever mentioned of toxic or idiosyncratic reactions, nor the addictive nature of alcohol or cocaine. Most of these ingredients are of botanical origin with pharmacological effects that are principally purgative (sometimes vermifugal), emetic or antipyretic. Many of them would also have been quite dangerous were it not for the homeopathic dosages employed. Capsicum, a derivative of pepper, was used in the past as a gastric stimulant. Its sole use currently appears to be as an active irritant in the newer forms of chemical repellent (eg, Mace). Cinchona powder (named after the Countess of Chinchon, Vicereine of Peru during the 17th century) is a tree-bark extract yielding an active alkaloid, quinine, and was sometimes called Jesuit's bark. Cypridium, said to be a nerve tonic, is an extract of orchid-like wild flowers such as lady's slipper, sometimes also called Venus's shoe. (Venus is alleged to have been born on the island of Cyprus and hence Kypris is a more ancient name for Venus. Cypriology and venereology, are each older terms for the study of sexually transmitted diseases — and the root of each of the words comes, respectively, from the Greek and Latin spellings of Venus's name.)

Reading an older issue of the Sears catalog makes us mindful of how widespread and persistent our American dreams remain. Yet, in scanning all of these thousands of pages of advertisements, it is hard to decide which is the more dominant force: conscious fraud or willful self-deception. Osler said that a supine credulity is still the most charming characteristic of man.

Stanley M. Aronson, MD

## A Tale of Dry Bones

Within hours of their entrance to medical education, generations of students had been impelled into the prosection room. In that intimidating chamber where the dead have been known to teach the living, they were required to memorize anatomic names and spatial relationships months or years before they were allowed to confront the living face of clinical medicine. Anatomy, preeminent among the basic medical sciences, became the inductive rite, the initial step, on the precarious road leading to the medical degree. In the young student's transition from undergraduate innocence to the high anxiety of medical student status, the gatekeeper's job was as-

signed to anatomy.

Current medical students regard the study of anatomy as necessary — but neither a happy nor challenging experience. In a world of evolving molecular insights and wondrous new investigative epiphanies, anatomy remains an unchanging archive. As such, it is a comfort to some but a boring trial to others. The names, origins and insertions of the voluntary muscles have not changed in centuries; nor have the names of the adult body's 206 bones varied notably in recent times. If nothing else, then, anatomy provides the young medical student with a small interlude of order and tidiness in an educational sequence otherwise filled with turmoil and instability. It is comforting to know that the articulations of the femur, painfully learned, will not be disavowed in next week's issue of *New England Journal of Medicine*. But in this demanding discipline of human anatomy — where answers to questions are either right or wrong — is there no poetry to soften this unyielding regimen? Are there no tales, from the mists of prehistory, explicating the origins of these anatomic names? There are few physicians, certainly, who do not happily recall the various poetic mnemonics for the names of the cranial nerves — even though their pathways and purposes have long since faded from memory.

In truth, there is some poetry in anatomic nomenclature, but sadly, when it came time to assign names to our primate bones, the metaphors dried up and the leaps of fantasy must have been stilled by the force of academic gravity. The osteologists rarely ventured far from proper nomenclature. To them a thigh bone was a thigh bone — neither a drum stick, a baton nor any other fanciful metaphor.

Consider, for example, the major bones of the limbs: the femur gets its name from a Latin word meaning thigh; the tibia, also from the Latin, means shin or pipe (hence, a tibia is also a flute); the fibula, in Latin, means a buckle or clasp (there seems little resemblance to a modern buckle, but perhaps Roman clasps looked differently); the radius is taken from the Latin word for spoke or rod; the ulna, comes from a Greek word, *olene*, meaning elbow. Olecranon means, in Greek, the head (*cranion*) of the elbow (*olene*).

The name, humerus, comes from the Latin *umerus*, meaning shoulder, which bears no etymologic relationship with another Latin word, *umor*, meaning fluid-containing, as in words such as humid, humoral, or the four humors of the body (the proportions of which were thought to produce such moods as melancholy, capriciousness, whimsy, bitterness and happiness. Thus, a person might be ill-humored, or good-humored. The unadorned word, humor, has come to mean only the latter.) The ulnar nerve rests upon the medial condyle of the humerus and is vulnerable to sharp blows, thus producing a tingling sensation. The elbow is sometimes called the funny bone, but in the old sense of funny, meaning curious, odd or weird.

The clavicle was named after the Latin word for little key (and hence an early instrument with keys and strings is called a clavichord; and a prison turnkey is called a clavicler). The word clavicle to denote the collar bone was first used by the great Islamic physician, Avicenna. In birds, incidentally, the two clavicles are medially fused into a bone called the *furculum* (Latin for fork). This is the bone referred to by non-anatomists as the wish-bone.

The scapula is derived from the Greek, *skaphein*, meaning a shovel. A shovel-shaped cowl worn by Benedictine monks is called a scapulary. (Scapulomancy, incidentally, is a form of divination based upon the interpretation of cracks formed on the surface of an animal scapula after it has been exposed to fire. The predictive accuracy of this procedure is unknown.)

Some naming errors persist to the present. The sacrum, for example, was named in Greek the strong-bone but when translated to Latin, became *os sacrum* (the holy-bone). Thoracic and cervical are Latin names meaning chest and neck. The names for other vertebral regions show modestly more imaginative risk. Lumbar is derived from the Latin, *lumbus*, meaning loins; and from a more primitive term meaning, curiously, either the buttocks or the soul. Coccyx, on the other hand, is named because it resembles the beak of a cuckoo bird. (Cuckold, incidentally, is named after the alleged infidelities of the adult cuckoo birds.)

The names of bones often have suffixes denoting that they are diminutives (eg, *-culum*, *-culus*, *-ola*, etc) or *-oid*, indicating a resemblance to something else. In the latter category we have bones called sphenoid (resembling a wedge), sesamoid (resembling a sesame seed), mastoid (resembling a breast), pterygoid (resembling a wing) and trapezoid (resembling a table).

At times bony structures are given names that depart substantially from the conventional, particularly when dealing with concavities. The acetabulum, for example, is the fusion of two Latin words meaning vessel to hold vinegar (Latin, *acetum*, as in acetic acid). What went through the head of the ancient anatomist when he was assigning a name to this unremarkable concavity in the pelvic girdle? The bad wine that he drank the night before? And the cavity protecting the pituitary gland reminded someone of a Turk's saddle rather than some less picturesque Latin word for a spherical cave.

When anatomy extends beyond the realm of the bones, the given names become somewhat more adventuresome, occasionally quite colorful, at times even salacious. These names may take on the coloring of the person who speaks them. A Greek word such as *hamartia* (ie, missing the mark) is surely a mercurial term to provoke the imagination. For the anatomist it remains a hamartia (a structural anomaly); for the pathologist it evolves into hamartoma (an embryonic neoplasm); for the psychiatrist, hamartophobia (fear of committing error); and for the theologian, hamartiology (a study of moral sin). Sin seems to occupy the terminal position of so many sequences.

Stanley M. Aronson, MD

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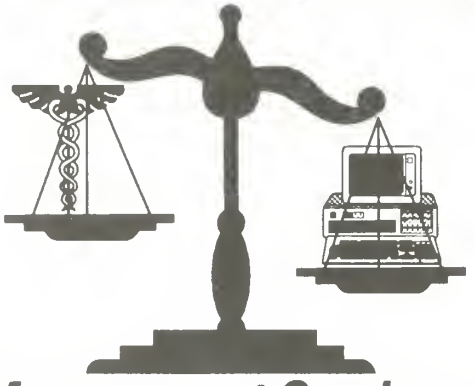

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# Inner City Health: An Overview

Barbara A. DeBuono, MD, MPH
Sharon K. Cagen, RN, MPH

***The largest provider of health services in inner-city Providence is the Providence Health Centers, officially known as Providence Ambulatory Health Care Foundation, Inc.***

The unique socioeconomic characteristics of inner-city Providence residents create distinctive challenges for health care delivery. Providers face a large minority population with significant ethnic diversity, speaking various languages, and with differing health care habits and lifestyles. Additionally, inner-city residents depend heavily on public insurance or are uninsured, creating significant financial pressures for providers.

## Demographics of Inner-City Providence

Inner-city Providence (the neighborhoods of South Providence, Elmwood, Washington Park and the West End) is home to 46,370 residents: 28% white, 27% African-American and 32% Hispanic, with an additional 10% Asian or Pacific Islanders. Thus minorities account for 72% of the inner-city population. This can be contrasted to a minority population of 21% in the rest of Providence and 11% in Rhode Island (Figure 1).

Annual household income for inner-city Providence residents is significantly lower than that of households in the rest of Providence or in Rhode Island. An analysis of 1988 household income by census tract showed that more than three-quarters of inner-city households had incomes below 200% of the poverty level. Inner-city residents are also four times more likely to occupy crowded housing units as residents of the rest of Providence.

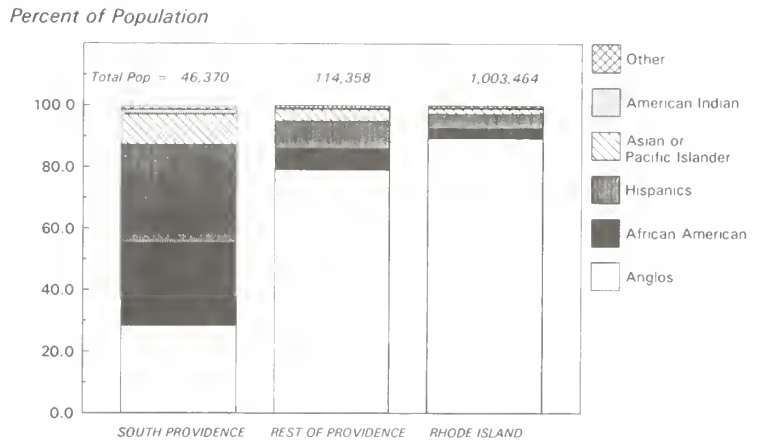


Fig 1.--Minority populations in Rhode Island.
*Source: South Providence Primary Care Task Force, 1992.*

## Inner-City Health Status

Inner-city Providence residents have a disproportionate share of disease that could be ameliorated or avoided by improved access to appropriate health care and preventive services. Many factors influence health care utilization patterns of inner-city residents, including: health insurance status, availability of outpatient services, educational, cultural, lifestyle and social barriers. Patients lacking a strong support system are more likely to be dependent on inpatient care.[1]

Hospital discharge data reveal that inner-city Providence residents had significantly higher hospitalization rates for "ambulatory sensitive" conditions (conditions that are largely preventable or treatable in ambulatory care settings) than residents of the rest of Providence.[2] For example, inner-city residents under age 65 were almost four times as likely to be hospitalized for pelvic inflammatory disease as were residents of the rest of Providence (Table 1.)

Inner-city residents are more than three times as likely to have sexually transmitted disease (STDs) as other Providence residents (Figure 2). Department of Health data indicate that the incidence rates of other reportable diseases such as hepatitis, measles and giardia are at least twice as high among Providence residents as among all Rhode Islanders.[3]

Maternal and child health indicators also reveal more problems among

***ABBREVIATIONS USED***
***AIDS: Acquired immune deficiency syndrome***
***ENT: Ear, nose and throat***
***PAHCF: Providence Ambulatory Health Care Foundation, Inc.***
***STD: Sexually transmitted disease***
***WIC: Women, Infants and Children nutrition program***

*Barbara A. DeBuono, MD, MPH, is director of the Rhode Island Department of Health and a clinical assistant professor in medicine at Brown University School of Medicine, Providence, Rhode Island. Sharon K. Cagen, RN, is project director for the Rhode Island Department of Health Primary Care Cooperative Agreement.*

Table 1.-Hospitalization Rates for Ambulatory Sensitive Conditions* 1990

| Condition | Age under 65 | | | Age 65 and Older | | |
|---|---|---|---|---|---|---|
| | South Providence | Rest of Providence | Ratio | South Providence | Rest of Providence | Ratio |
| Hypoglycemia | 7.8 | 1.2 | 6.6 | 32.3 | 27.8 | 1.2 |
| Gastroenteritis | 120.4 | 53.2 | 2.3 | 135 | 77.5 | 1.7 |
| Kidney/urinary Infection | 127.5 | 54.4 | 2.3 | 1123 | 435.7 | 2.6 |
| Pelvic inflammatory disease | 90.8 | 24.3 | 3.7 | 0 | 0 | - |
| Hypertension | 39 | 7.7 | 5.1 | 62.9 | 31.5 | 2 |
| Angina | 180.8 | 118.8 | 1.5 | 1241.4 | 906.1 | 1.4 |
| Cellulitis | 336.1 | 99.9 | 3.4 | 742.9 | 315.6 | 2.4 |
| Diabetes without complications | 13.2 | 2.4 | 5.6 | 0 | 0 | - |
| Chronic obstructive pulmonary disease | 72.5 | 38.4 | 1.9 | 840.7 | 391.1 | 2.1 |
| Bacterial pneumonia | 321.7 | 160.1 | 2 | 2280.2 | 1013.1 | 2.3 |
| Asthma | 380.4 | 187.2 | 2 | 292.6 | 187 | 1.6 |
| Congestive heart failure | 194.4 | 91.6 | 2.1 | 3447.3 | 1866.1 | 1.8 |
| Convulsions, age >65 | 90 | 29.5 | 3.1 | 528.5 | 83.2 | 6.3 |
| Severe ENT infections | 67.6 | 35.4 | 1.9 | 87.7 | 16.9 | 5.2 |

*Ambulatory sensitive conditions are defined as diagnostic categories that are considered preventable or treatable in ambulatory care settings. Source: South Providence Primary Care Task Force, 1992.

inner-city residents. Birth rates among inner-city residents are significantly higher in every age group. Inner-city women have a higher rate of low-weight births (109 per 1000 births) when compared to the rest of Rhode Island (70 per 1000). The 1988 inner-city infant mortality rate was 11.5, compared to 6.3 for the rest of Providence and 8.2 statewide. The teenage (age 13 to 17) pregnancy rate in inner-city Providence is 35% greater than that of the rest of Providence.[4]

## Providers in the Inner-City

Inner-city residents are served by a variety of providers: health centers, hospitals, a limited number of private practitioners and some specialized providers such as the Travelers Aid Medical Van.

The largest provider of health services in inner-city Providence is the Providence Health Centers, officially known as Providence Ambulatory Health Care Foundation, Inc. (PAHCF). Five sites are located throughout Providence; the largest, Allen Berry and Central Health Centers, are in South Providence and the West End, respectively. These two sites provided more than 17,300 primary care visits in inner-city Providence in 1990. Primary care medical services were linked with additional services essential to inner-city populations such as translators, social services and community outreach.

PAHCF, Inc., faces numerous challenges as it delivers comprehensive primary care services. Problems include a lack of adequate physical space, difficulties recruiting providers, and delays in obtaining specialty referrals. Waiting times of up to 4 to 6 months exist for certain types of appointments, particularly pediatrics. The Department of Health and PAHCF are working closely together to seek solutions to these problems.

Other inner-city providers include the Rhode Island Hospital Primary Care Clinics, Women and Infants Hospital Primary Care Clinics, St Joseph's Hospital Primary Care Clinics and the Travelers Aid Society Medical Van. Table 2 indicates the number of visits by inner-city residents to these providers in 1990. (Table 2 also shows that inner-city residents received an additional 2272 primary care visits from the Cranston Health Center, located in the Cranston Street section of Cranston, near the inner-city.)

The primary care providers listed provide a wide range of primary care services. These include basic services such as prenatal care, pediatrics, adult medicine and family planning. AIDS education, colposcopy, cryosurgery, nutrition counseling, WIC, lab services, community outreach and social services also are offered at most sites. Other services such as dental, podiatry, optometry, substance abuse counselling, refugee health, allergy treatment and others are offered at some sites only.

While many private primary care physicians maintain offices in the Providence inner-city (usually on a hospital campus or in an adjacent professional office building), their services often are not accessible to inner-city residents. Reasons for this are complex and multifactorial. Many physicians, including a majority in South Providence, for example, refuse to accept Medical Assistance due to low reimbursement and cumbersome paperwork. Other factors include residents' lack of insurance and the lack of translator and other services in private offices.[5]

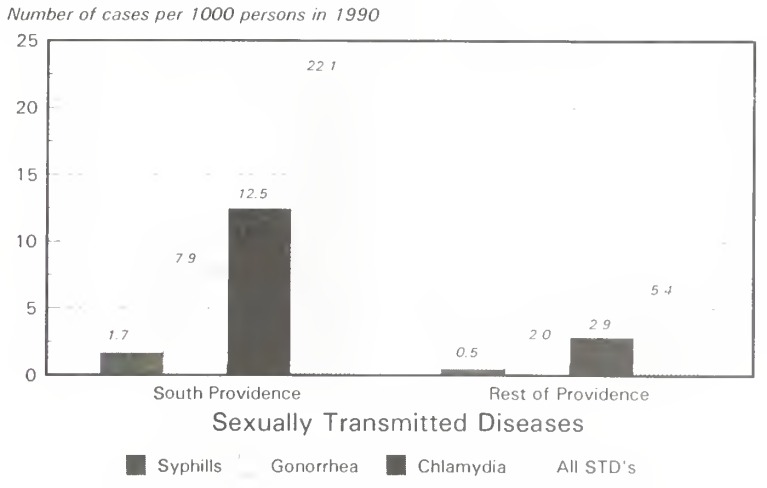


Fig 2.-Incidence of STDs in Providence. Source: South Providence Primary Care Task Force, 1992

## Access to Care

Since 1991, the Department of Health has participated in a South Providence Primary Care Task Force. The task force was created to assess the ability of the existing primary care delivery system to meet the needs of inner-city residents and to develop recommendations for improving the system's ability to meet these needs.

The task force found that inner-city residents face serious difficulties in accessing primary care services, despite their wide availability. A recent analysis of inner-city primary care indicated that the current delivery system is providing an estimated 50,352 visits yearly, while there is an annual need for 160,775 visits, resulting in an estimated unmet visit demand of 110,423 visits.[5] Reasons for this discrepancy include: limited numbers of primary care providers, limited public transportation and long waiting times for appointments.

To address this problem, the task force is currently seeking funding to develop a coordinated, more efficient delivery system that would include the following components: linked patient records or other tracking system to reduce duplication of services, improved referral relationships, strengthened case management, closer links among primary care providers, closer affiliations between teaching programs and prevention and education programs for consumers.[5] One by-product of the unmet demand in inner-city Providence is an increase in inappropriate use of emergency rooms. Thirty-nine percent of inner-city primary care delivered in organized settings in 1990 was delivered in hospital emergency rooms. At Rhode Island Hospital, 41% of the 103,000 emergency room visits in 1990 were for primary care; 33% of these (14,000 visits) were made by inner-city residents.[5]

While not a direct service provider, the Rhode Island Department of Heath supports a large number of services, primarily through funding and support of categorical programs offered at inner-city health centers and hospital clinics (Figure 5). Most of these programs are provided statewide; however, the preponderance of funds, resources and energy is channeled to inner-city Providence, where the majority of the state's most high-risk populations are located.

The Department of Health is committed to ensuring a strong primary care delivery system for inner-city residents. In 1992 the department established a new Office of Primary Care, reporting directly to the director of health. The chief mission of this office is to ensure access to comprehensive primary care for all Rhode Islanders. The office will analyze and make recommendations on the following primary care issues: increasing the supply of primary care providers, reducing financial and other barriers to access, incorporating the concept of prevention into primary care practice, and developing outcome measurement standards for primary care.

The Department of Health is committed to working with all segments of the primary care community to achieve these objectives. A newly reconstituted Primary Care Advisory Committee has been established recently

Table 2.-Number of Visits by Inner City Residents to Primary Care Providers

| Services | Allen Berry | Central | RI Hospital | Women & Infants | St Joseph's | Cranston | Travelers Aid Society |
|---|---|---|---|---|---|---|---|
| Adult Primary Care 2441 | | 2195 | 4112 | 0 | 2653 | NA | NA |
| Pediatric | 4768 | 4227 | 5861 | 0 | 4416 | NA | NA |
| OB/GYN | 1962 | 1708 | -- | 8045 | 3059 | NA | NA |
| Medical Van** | -- | 2644 | -- | -- | -- | -- | 2644 |
| Total 9171 | 8130 | 9973 | 8045 | 10,128 | 2272* | 2644 | |

* Data were not available by specific service from Cranston Community Health Center.
** Medical van visits are primarily screening and referral services. There is always a physician present.

Table 3.—Inner-City Health Programs Sponsored by the Rhode Island Department of Health

| Program | No. of Inner-City Residents Served per Year (est.) |
|---|---|
| Lead Screening & Treatment | 18,000 |
| Family Planning Program | 4,600 |
| STD Education Screening & Treatment | 4,600 |
| WIC | 4,090 |
| Pediatric Preventive Services | 2,790 |
| AIDS Education and Testing | 1,270 |
| Diabetes Prevention & Education | 1,270 |
| Prenatal Services | 1,230 |
| TB Screening & Treatment | 850 |
| Refugee Health | 490 |
| Breast & Cervical Cancer Screening | 400 |
| Early Intervention Services | 200 |
| Rite Start Program | 150 |

Source: Rhode Island Department of Health, Division of Disease Control and Family Health, 1992

for this purpose. It includes representatives from private sector physicians, health centers, hospitals, health maintenance organizations, insurers, consumers and various state agencies. Three task forces are meeting to develop specific recommendations in the areas of access and financing, supply of primary care providers and outcome measurements.

The major agenda for the Office of Primary Care in the first 6 months of 1993 will be the development of the Primary Care Plan. This plan will incorporate the recommendations of the three task forces and will create a blueprint for Department of Health activity to improve the state's primary care delivery system.

All Department of Health primary care development activities are being closely coordinated with the "Healthy People 2000" objectives set by the US Department of Health, and Human Services. Several committees have been meeting for the last year to establish Rhode Island's priorities for the Year 2000. "Access to primary care" has been identified as a top priority by the Year 2000 Committee. The Department of Health also created an Office of Minority Health in 1991 to ensure that minority health issues and concerns are incorporated into all Department programs and services.

## Future Challenges

Despite the progress already made, significant challenges face the Providence inner-city health care delivery system. A major issue is the need to expand the capacity of the current system. This lack of capacity will become even more pressing as consumers become better educated and more aware of the need for primary care and prevention services. The demand for services is also likely to increase as more currently uninsured city residents become insured through state and/or federal initiatives.

To address this concern, the Department of Health's new Office of Primary Care is analyzing the factors that influence the supply of primary care providers overall, as well as in the inner-city. Factors identified to date include: the trend away from primary care career choice among newly trained physicians, perceived lack of prestige/support for primary care, higher income potential for specialty providers and a perception that competency in primary care delivery is difficult to achieve. A 1992 survey on physician job satisfaction, conducted by the RI Health Center Association, indicated that health center physicians are largely satisfied with their jobs. The average rating for "overall satisfaction" was 3.5, on a scale from 1 (not very satisfied at all) to 5 (very satisfied).[6]

The Primary Care Provider Supply Task Force will be developing recommendations during the next several months on how to increase the supply of primary care providers in Rhode Island. Possible recommendations include a loan repayment program for physicians who agree to practice in underserved areas, malpractice subsidies, tax incentives, increased Medicaid reimbursement and social and other services to assist physicians in serving inner-city populations. The Department of Health has received funding to establish links between the Brown Medical School and health centers to influence career choice among medical students and residents by early exposure to ambulatory care.

The Office of Primary Care at the Department of Health will be addressing additional challenges over the next several months. They include: how to incorporate prevention into the delivery of primary care for inner-city populations; how managed care should be provided to this population; how to provide additional support and resources to the providers currently serving this population; and how to increase private sector involvement in caring for the inner-city population.

***One by-product of the unmet demand in inner-city Providence is an increase in inappropriate use of emergency rooms.***

The Office of Primary Care is particularly interested in developing strategies and incentives to increase private physician participation in meeting the primary care needs of the inner-city. One strategy under consideration is the development of physician networks that would provide support and resources to help providers serve low-income patients. Another strategy is to encourage greater use of mid-level providers (nurse practitioners, physician assistants, or certified nurse-

midwives), both at community health centers and in private physician practices.

Improving the quality of medical care, especially for those who traditionally have been underserved, requires that the primary care infrastructure be strengthened. This can only be accomplished through a strong collaborative effort among all the involved parties, including the health centers, private physicians, hospitals, the Department of Health, and other governmental agencies.

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# Whom Do We Serve?

Vidal P. Perez, MSW

***In 1991, close to one in four of Providence's residents [23%] lived at or below the poverty level.***

In providing for the health care needs of its patients, the Providence Ambulatory Health Care Foundation, Inc. (PAHCF), draws on a 25-year history of service to the community. This history of service is built on an evolving set of community relationships, guiding principles of practice, insight into a myriad of needs, and clinical and administrative programs that respond to increasingly sophisticated internal and external demands. PAHCF operates five community health centers and two satellite high school clinics in inner-city Providence (Table 1). In 1991, there were 72,041 patient visits to the PAHCF physicians and nurse-practitioners.

The PAHCF is successful because members of its board of directors live and work in the community, its staff members speak the languages of the patients, its management system builds in the operational structure to provide appropriate service, and its medical providers recognize and respond to the overwhelming health care problems that their patients encounter on a daily basis.

Historically, the neighborhoods of Providence witnessed an ebb and flow of American citizens and immigrants, of richly unique cultures and races, of extended families and individuals. At the turn of the century, Providence was the nation's leading jewelry producer and the second leading manufacturer of woolen goods, drawing tens of thousands of immigrants to mill employment. Providence maintains this role today as the center of the costume jewelry industry. People continue to come here because of perceived employment opportunities. In contrast to that perception, statewide unemployment is at a 9-year high. The resulting recession has dramatically decreased work opportunities at all levels and has seriously exacerbated the inability of the city's poor to obtain even unskilled jobs. In 1991, close to one in four of Providence's residents (23%) lived at or below the poverty level.

The population of Providence is 160,725 (1990 census). Of that number, 75,436 (47%) live within the PAHCF primary service area, defined as census tracts 1-14,18,19,25,26, and 37 (Figure 1). Of the 52% females and 48% males who live in the service area, 29% are under the age of 18. While racial and ethnic minorities comprise 30% of Providence residents, they comprise 66% of the health centers' primary service area as follows: 34% white, 26% Hispanic, 15% black, 14% other, 9% Asian, and 2% American Indian.

During 1991, PAHCF provided health care services to about 13% of Providence residents. Of the 23,432 health center's users in the last year, 80% lived within the PAHCF's designated service area. The racial and ethnic composition of the PAHCF user population is: 42% Hispanic, 19% black, 18% white, 13% Asian, 7% other (84% of whom are Portuguese), and 1% Native American. Among users classified as Asian, 42% are Cambodian, 20% are Lao, and 12% are Hmong, each with their own spoken and written language. Clearly, PAHCF's clients represent a mix of racial and ethnic groups whose barriers to seeking health care include languages other than English as well as culturally unique perspectives on the nature of illness and the provision of medical care.

The PAHCF service area approximates that of the Health Professional Shortage Area, which includes census tracts 1-29, as well as that of the federally designated Medically Underserved Area, which includes census tracts 3-14, 25~27, 31, and 37. Increased risk of infant morbidity and mortality, childhood disease, delayed prenatal care, chronic illness, infection, and sexually transmitted diseases indicate the unmet need for early diagnosis and prevention activities.

Economically, 70% of the users are at or below 100% of the federally defined poverty level, 17% are between 101% and 150% of the poverty level, and the remaining 13% are between 151% and 200% of poverty. Of the 58% female and 42% male users, nearly half (43%) are under the age of 18. Thirty-two percent are women within the childbearing ages of 15 and 44. The concentration of women and children in the health centers greatly affects the nature of both services and their providers.

Of the 1214 new prenatal patients in 1991, 350 (28%) were under age 19. More than two-thirds (69%) of prenatal patients were single heads of households living at or below the poverty level. Among the new prenatal patients, 51% (608) were Hispanic and 15% (181) were Southeast Asian. Over 72% of all new prenatal patients were born outside the US. A total of 700 (59%) never obtained a high school diploma or equivalency certificate. Women who experience poor pregnancy outcomes are more likely to be poor, undereducated and single heads of households. Also women who

***ABBREVIATIONS USED:***
***AIDS: Acquired immune deficiency syndrome***
***HPSA: Health professional shortage area***
***MUA: Medically underrserved area***
***PAHCF: Ambulatory Health Care Foundation, Inc***
***STD: Sexually transmitted disease***

*Vidal P. Perez is the Executive Director of the Providence Ambulatory Health Care Foundation, Inc.*

smoke, abuse substances and/or have a sexually transmitted disease during pregnancy are at increased risk. Of the patients at the PAHCF that had preterm deliveries, 27% were smokers, 20% had a STD, and 12% reported using substances.

Because PAHCF's primary care services reach many Providence citizens, the agency is a key player in the health service delivery system in the city and a central force among the community health centers in the state. PAHCF maintains ongoing relationships with a number of health and human service agencies, both public and private. Some of these include Rhode Island Hospital, Women and Infants Hospital, St Joseph Hospital, the Rhode Island Department of Health, the Rhode Island Department of Human Services, Office of Refugee Resettlement, area physician training programs, and numerous organizations that target special populations, such as the International Institute and Rhode Island Project AIDS. The agency's professional and allied health personnel are active in many of these organizations, in addition to their work at the health centers. The administrative staff at PAHCF play leading roles on city and regional health care committees external to the agency, but integral to its coordination of care with other service providers.

*Send correspondence to:*
*Vidal P. Perez, MSW*
*Providence Ambulatory Health Care Foundation, Inc.*
*469 Angell Street*
*Providence, RI 02906*

Table 1.—Providence Ambulatory Health Care Foundation, Inc. Health Center Sites

**Allen Berry Health Center**
202 Prairie Avenue
Providence, RI 02905
(421-4303)
Mon, Tues., Thurs. - 1PM to 9PM
Wed. & Fri. - 9AM to 5PM

**Capitol Hill Health Center**
40 Candace Street
Providence, RI 02908
(861-9200)
Mon. & Fri. - 9AM to 5PM
Tues., Wed., Thurs. - 1PM to 9PM

**Central Health Center**
239 Cranston Street
Providence, RI 02907
(831-7060)
Mon., Tues., Wed. - 1PM to 9PM
Thurs. & Fri. - 9AM to 5PM

**Fox Point Health Center**
550 Wickenden Street
Providence, RI 02903
(521-9220)
Mon., Tues., Thurs. - 1PM to 9PM
Wed. & Fri. - 9AM to 5PM

**Olneyville Health Center**
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# Prenatal Care in the Inner-City: A Cooperative Effort

Carolyn B. Day, MD
Patrick J. Sweeney, MD, PhD

***A patient's pregnancy is an opportunity to modify maternal behaviors which place both the patient and her infant at risk. A mother's natural desire to have a healthy baby is highly motivational, often providing the woman with an extra incentive to alter her lifestyle and abandon unhealthy behaviors.***

Through a highly successful, cooperative program, the Providence Ambulatory Health Care Foundation (PAHCF) and Women and Infants Hospital of Rhode Island have been providing prenatal and inpatient obstetrical care for two-thirds of the state's low-income, pregnant women enrolled in the Rhode Island Department of Health's Comprehensive Prenatal Services Program.[1] Women and Infants Hospital is the sixth-largest women's hospital in the United States, and is the regional perinatal center for southeastern New England. In addition to its tertiary level services, however, Women and Infants' outpatient department annually provides primary care services to more than 5700 women of all ages. It is only natural that Women and Infants Hospital and the PAHCF would combine their resources and talents to provide high-quality, accessible, and culturally sensitive prenatal and obstetrical care.

Prenatal patients served by PAHCF live within a few miles, or in some cases within blocks, of Women and Infants Hospital. Yet for many patients there are real or perceived barriers to accessing care. Many live in poverty and are illiterate. Many speak only their native language (Spanish, Portuguese, Cambodian, Russian, Laotian, or French) and are frustrated with the inability to communicate directly with caregivers; they worry that important details may be lost through the use of interpreters. Many lack transportation or telephones. They fear medical procedures and are unfamiliar with the technology with which they are confronted in the hospital setting. Together, PAHCF and Women and Infants Hospital attempt to allay these fears and to eliminate obstacles to prenatal care for this culturally diverse and unique patient population. In 1987, 2200 pregnant women received their care through this cooperative arrangement; by 1991, this number had increased to 3000 (Table 1).[1] Sixty percent received their prenatal care at Women and Infants, 40% at the PAHCF sites; all patients delivered at Women and Infants.

Although pregnancy may be the original motivation for seeking medical care, many acute and chronic conditions often are detected that would otherwise have gone untreated. The maternal-child health program at PAHCF is challenged with addressing the needs of pregnant clients such as these. Frequently this interaction is compressed into only a few months, although there has been a trend toward earlier presentation for prenatal care. The latter may reflect a combination of patient education and introduction of an incentive program in 1991 that rewarded patients meeting certain objectives, such as first trimester enrollment, with gift certificates for local grocery or department stores. In addition, PAHCF refers all pregnant women who register for care after 36 weeks gestation directly to Women and Infants.

## Populations Served

Women of reproductive age in the inner city often tend to neglect their health care needs until they are confronted with an acute illness or pregnancy. Many of these pregnancies are unplanned. The majority of women who seek prenatal care at PAHCF lack health insurance; 70% of these women live at or below the poverty level. Those with health insurance tend to be non-English speaking clients who are drawn to PAHCF due to its location near their homes, its flexible hours of operation, and the availability of on-

*Carolyn B. Day, MD, is a board-certified obstetrician-gynecologist in practice at the Providence Ambulatory Health Care Foundation, Inc. She is affiliated with Women and Infants Hospital and is a clinical instructor, Obstetrics and Gynecology, Brown University School of Medicine. Patrick J. Sweeney, MD, PhD, is a board-certified obstetrician-gynecologist and is director, Ambulatory Care, Women and Infants Hospital. He is a professor, Obstetrics and Gynecology, Brown University School of Medicine.*

***ABBREVIATIONS USED***
***HBIG: Hepatitis B immune globulin***
***HIV: Human immunodeficiency virus***
***HPV: Human papilloma virus***
***LBW: Low birth weight***
***PAHCF: Providence Ambulatory Health Care Foundation, Inc***
***PPD: Purified protein derivative***
***RPR: Rapid plasma reagin***
***STD: Sexually transmitted disease***
***TB: Tuberculosis***
***WIC: Women, Infants and Children nutrition program***

site bilingual staff or interpreters. The following two case scenarios help illustrate the complex medical and psychosocial needs of these inner city prenatal clients:

**Case No. 1** is a 27-year-old primigravid black woman at 18 weeks gestation who immigrated from Nigeria 1 month ago. Evaluation of her anemia (hemoglobin 8.2 gm/dl) reveals sickle cell trait on hemoglobin electrophoresis, as well as ring forms consistent with Plasmodium falciparum on peripheral blood smear. In addition, she has a positive Mantoux test. She lacks health insurance.

**Case No. 2** is a 21-year-old gravida 2, para 1, Hispanic woman whose ultrasound for confirmation of gestational age shows a fetal defect compatible with meningomyelocele at 19 weeks gestation. Her previous delivery was preterm following premature rupture of membranes at 35 weeks gestation. She has a history of cervical condyloma treated 2 years ago with cryotherapy and she has failed to keep any follow-up appointments for this problem.

In 1991, 1807 women registered for prenatal care at Women and Infants, and an additional 1185 enrolled for care at PAHCF. Most of these women (62%) were single heads of household; more than half (51.2%) had not completed high school or obtained the equivalent of a high school diploma. Overall 42% were born outside of the US. With respect to past obstetrical history, 37.5% had no previous live births, while 6.9% had had four or more live births in the past. Twenty percent were age 19 or younger; 6.25% were age 35 or older. The demographic breakdown of the patients who received their prenatal care at Women and Infants and the PAHCF is summarized in Table 1. The PAHCF sites had higher percentages of patients of Hispanic and Southeast Asian ethnicity, in part due to the factors mentioned earlier —location and bilingual staff.

Table 1.—Demographic Characteristics of Prenatal Patients Seen in the Women & Infants (W & I) and Providence Ambulatory Health Care Foundation (PAHCF) Clinics, 1991.

| Characteristic | W & I (%) n=1807 | PAHCF (%) n=1185 |
|---|---|---|
| **Age Group** | | |
| 10-14 | 0.22 | 0.34 |
| 15-19 | 21.75 | 16.62 |
| 20-24 | 37.24 | 33.76 |
| 25-29 | 21.36 | 26.16 |
| 30-34 | 13.34 | 16.20 |
| 35-39 | 4.93 | 5.49 |
| 40-44 | 0.94 | 1.10 |
| >45 | 0.22 | 0.17 |
| **Weeks Gestation at 1st Visit** | | |
| 12 | 36.41 | 48.78 |
| 13-26 | 43.05 | 43.71 |
| > 27 | 17.93 | 7.51 |
| **Race/Ethnicity** | | |
| White | 52.41 | 13.42 |
| Black | 22.69 | 14.77 |
| Hispanic | 18.93 | 51.31 |
| Asian | 2.38 | 15.27 |
| Portuguese | 1.72 | 1.01 |
| Native American | 0.39 | 0.17 |
| **Marital Status** | | |
| Single | 66.57 | 54.77 |
| Married | 22.19 | 31.81 |
| Divorced | 5.09 | 3.54 |
| Separated | 5.26 | 7.68 |
| Widowed | 0.12 | 0.34 |
| **Financial Category** | | |
| Poverty | 43.17 | 69.87 |
| Low | 28.72 | 20.93 |
| Middle | 17.04 | 4.64 |
| High | 5.81 | 0.68 |

## Special Services Offered

A team approach is used to improve the pregnancy outcomes of women who receive prenatal care in this network. Nurses obtain details of the patient's social, medical and obstetrical history and provide HIV counseling and education. Social workers assess psychosocial risk factors and financial resources of individual patients at the time of their first visit. Women who admit to drug abuse or domestic violence are encouraged to seek assistance from appropriate community resources. Eligible patients are encouraged to apply for medical assistance or Rite Start; this practice has resulted in a decrease in the number of PAHCF patients who are uninsured at delivery from 12% in 1989 to approximately 4% in 1991. Every patient has a nutritional assessment performed by a nutritionist and most patients are enrolled in the WIC program. Nurse practitioners, residents, and board-certified specialists in obstetrics and gynecology provide the prenatal care. In the health centers these providers are supervised by two full-time obstetrician-gynecologists; while at Women and Infants, supervision is provided by full-time and clinical faculty from the Brown University Department of

Obstetrics and Gynecology.

A patient's pregnancy is recognized as an opportunity to widen the scope of preventive health care. Immunizations are updated, with tetanus boosters administered antepartum and rubella vaccine given postpartum to susceptible women. Hepatitis B vaccine also may be administered to high-risk women. Women who are chronic carriers of hepatitis B (2% of PAHCF prenatal patients in 1991) are identified through universal screening done on all new prenatal clients. This information is documented in the prenatal record and periodic summaries of hepatitis B surface antigen-positive patients are forwarded to Women and Infants Hospital so that the patient's newborn can receive HBIG, as well as hepatitis B vaccine. Close contacts of hepatitis B carriers, particularly other household members, are also tested.

A Mantoux test is administered upon presentation for prenatal care in those whose histories of PPD reactivity are negative or uncertain. In 1991, 28% of PAHCF patients were PPD reactors. A second trimester chest X-ray is obtained in all asymptomatic PPD reactors, and an effort is made to refer these patients to the Roger Williams General Hospital TB Clinic before delivery to educate them regarding chemotherapeutic prophylaxis. Recent convertors or patients with abnormal chest X-rays are referred on an urgent basis. Care of prenatal patients with suspected active TB is closely coordinated with physicians at the TB clinic. Again, household contacts of prenatal patients are sought for testing.

Patients considered to be at high risk for an adverse pregnancy outcome are "care-coordinated" with intensified follow-up, outside referrals, and periodic re-assessments usually mediated by the perinatal nurse involved in the patient's care. Women at risk for genetic disorders due to maternal age or family history, as well as those identified through maternal serum alpha-1-fetoprotein (a screening test for neural tube defects and some chromosomal abnormalities), are referred for genetic counseling at Women and Infants Hospital or Rhode Island Hospital. Hemoglobin electrophoresis is done for women who are black or of Hispanic origin to identify carriers of sickle trait. Mediterranean or Asian women with microcytic anemia who are not iron-deficient are screened for thalassemia by hemoglobin electrophoresis. If the father of the baby is available for testing and is also considered to be at risk for having a hemoglobinopathy, the couple is referred for genetic counseling.

In addition to prenatal diagnostic services, fetal surveillance is carried out at Women and Infants Hospital for patients with pregnancies at increased risk due to conditions such as hypertension, multiple gestation or postdatism. Women who are diagnosed with gestational diabetes (3.3% of prenatal patients at PAHCF) are referred to Women and Infants Hospital's Diabetes in Pregnancy Program.

***...a 1989 statewide survey that anonymously tested the urines of all women admitted in labor revealed that 7.5% tested positive for illicit substances.***

A patient's pregnancy is an opportunity to modify maternal behaviors that place both the patient and her infant at risk. A mother's natural desire to have a healthy baby is highly motivational, often providing the woman with an extra incentive to alter her lifestyle and abandon unhealthy behaviors. Smoking is one such behavior. A pilot study is underway at the health centers to explore strategies which may assist prenatal clients in smoking cessation efforts.

Although accurate prevalence data on alcohol and drug abuse is difficult to obtain, a 1989 statewide survey that anonymously tested the urines of all women admitted in labor to any of the state's eight maternity units revealed that 7.5% tested positive for illicit substances.[2] Women with public insurance coverage were four times more likely to be positive (16.1%) than were women with private insurance (4.1%). Cocaine was detected more commonly in women who had any one of the following risk factors: (a) race other than white, (b) public health insurance, (c) living in poverty, and (d) multiparity. In addition, this survey likely represents an underestimate of the actual prevalence of drug abuse since the urine drug screen was only able to detect drug use within the previous 48 hours, and did not test for alcohol.

Patients who admit to substance abuse during the course of their prenatal care are encouraged to seek counseling and/or treatment. Project Link, a federally-funded program for substance-abusing pregnant and postpartum women and their infants, is based at Women and Infants Hospital; patients referred to the project are offered a comprehensive package including prenatal and postpartum care, substance abuse treatment tailored to the individual's needs, and intensive infant follow-up. Several other agencies and community resources are also available to assist women in dealing with addictive behaviors.

Unfortunately information on substance abuse is obtained primarily by patient self-report; therefore, these special services can only be made available to women who are willing to admit to past or present drug use. The motivation to have a healthy baby, combined with non-threatening, nonjudgmental information on the potential effects of prenatal drug abuse on the developing fetus, often will enable a patient to acknowledge her abuse and seek counseling. However, researchers have consistently found that patient's self-report of illicit substance use is highly unreliable; 40% to 60% of prenatal patients with positive toxicology screens deny substance abuse.[3,4] In addition, patients with the most serious substance abuse problems often fail to seek prenatal care at all.

Sexually-transmitted diseases (STDs) including syphilis, gonorrhea, chlamydia and human papilloma virus (HPV) may increase the risk of preterm delivery or other adverse sequelae in the neonate. An RPR and gonorrhea culture are obtained at the beginning

of each woman's pregnancy; these two tests are repeated and a test for chlamydia performed on all patients who reach 36 weeks gestation. Among PAHCF clients in 1991, 2% had a reactive RPR, 2.3% were culture-positive for gonorrhea and 8.3% of those for which a chlamydia test is documented (100 of 819 prenatal patients) had a positive result. These STDs may co-exist with, or be markers for, sexual behaviors that increase a patient's risk of HIV infection. All prenatal clients are counseled regarding HIV transmission and offered testing at their initial prenatal visit and whenever an STD is diagnosed. Periodic counseling and testing is offered at intervals throughout the pregnancy for women who remain at risk.

Other prenatal educational efforts directed at PAHCF patients include childbirth education, which is offered on-site in both English and Spanish. Breastfeeding is encouraged by health center staff and a lactation consultant visits postpartum patients to provide additional support to those who choose to breastfeed. All patients are urged to consider options for family planning prior to their delivery so that their next pregnancy will be planned. In 1991, 54% of prenatal patients at PAHCF had family planning counseling prior to their deliveries. Lay counselors who have been trained to provide this patient education are part of the staff at each health center. They review all options with clients and try to guide patients to a safe and effective choice for contraception.

## Pregnancy Outcome

Pregnancy outcomes are influenced by a variety of factors, especially the mother's general health status. The more risk factors — medical, social, and nutritional — that the mother has, the greater the likelihood of a poorer outcome. Infant birth weight has long been recognized as a measure of a population's maternal and child health status; of all infants who die, about 60% are of low birthweight (less than 2500 grams). In 1989, the overall US rate of low birthweight (LBW) was 7%, with marked racial disparities (5.7% for whites, 13.2% for blacks).[5] The overall LBW rate for Rhode Island in 1989 was 6.2%.

Pregnancy outcome data for patients who received their prenatal care through the combined efforts of PAHCF and Women and Infants Hospital are reflective of the high-risk nature of the populations. Of the 2534 births to these patients in 1991, 44 were very low birthweight (less than 1500 grams) and an additional 191 weighed from 1500 to 2499 grams, for a total LBW rate of 9.3%. Those women who were identified prenatally as having risk factors significant enough to be referred to the Antenatal Center at Women and Infants had a LBW rate of 19.4%. (This percent refers only to those patients initially registered as high risk patients; it does not include those who were transferred to the high risk service later in pregnancy, or during their hospitalization for labor and delivery.)

## Summary

PAHCF and Women and Infants Hospital have been working together for many years to provide high quality, accessible prenatal and obstetrical care to low-income, inner-city residents in the Providence area. Many of these patients have multiple medical, social, and nutritional problems that place them at increased risk for poor pregnancy outcomes. The PAHCF sites offer convenient locations, evening hours, and culturally-sensitive, bilingual staffs; together the five sites provided prenatal care to nearly 1200 patients last year. Women and Infants Ambulatory Care Department provided prenatal care to an additional 1800 women in 1991, including all high risk patients referred for complications or diagnostic evaluations. All patients deliver at Women and Infants, then return to their original source of care for postpartum followup and family planning services. Patient records are readily transferred between the sites, eliminating the need for unnecessary duplication of information or laboratory tests. This close collaboration is mutually beneficial to both the health care providers and the patients whom they serve.

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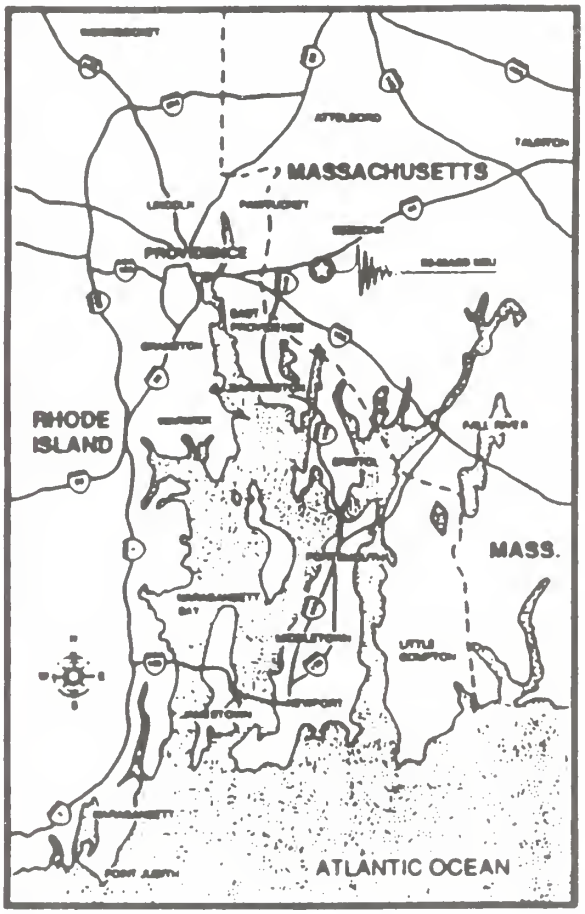


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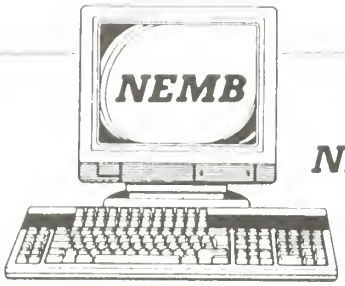


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# Inner-City Pediatrics: Perspectives on Access

Ellen L. Gurney, MD
Peter Simon, MD, MPH

***Many inner-city mothers are young, single and have no extended family members who are experienced in child care, illnesses, accident prevention, or recognition of hazards such as chewing paint.***

A gradually declining New England economy, the arrival of thousands of Southeast Asian refugees in the late 1970s and 1980s and the continued migration of families from the Dominican Republic, Puerto Rico, Central and South America, Liberia, Nigeria, the USSR, and Haiti have all contributed to a steady increase in the numbers of people needing affordable, multilingual, culturally sensitive, and geographically accessible health care.

From 1982 to 1991, the annual pediatric encounters at PAHCF increased from 17,819 to 31,840. In 1991, 52% of all PAHCF users were children 18 or younger, with 28% of all users under 4 years old. In 1991, about 1000 newborns were managed on the pediatric normal nursery service at Women & Infants Hospital by PAHCF pediatricians. Within 4 weeks of discharge from Women & Infants Hospital, 692 of these babies were seen in one of the health centers for outpatient care. Eighty more babies were followed in the Special Care Nursery by the Neonatology Service and became health center patients at discharge.

Our five health centers are staffed by seven PAHCF pediatricians, one pediatric nurse practitioner and several part-time consultants. Pediatric sessions are booked with appointments for regular newborn and pediatric care, chronic illnesses and follow-up of acute illnesses. Urgently ill patients most often present as walk-ins, unable to call due to lack of a phone. Any patient may register to be seen, regardless of insurance or ability to pay.

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## Birth to Preschool: The Medical Problems

The health care needs of this patient population are broad. Newborns often are seen in the first month of life with questions regarding cord care, neonatal acne, diaper rashes, stooling problems, "crying," or with symptoms of vomiting, constipation, runny nose, conjunctivitis, cough, staphylococcal skin infections, thrush, moniliasis, or fever.

Ethnicity, socioeconomic status and maternal medical history (Table 1) are factors affecting infants' health care needs. These factors may result in the need for more extensive screening or prophylactic therapy than in the general population. For example, babies born to mothers with positive PPDs require PPD testing at 1, 3 and 12 months. Those whose mothers are hepatitis B carriers require hepatitis B immune globulin at birth and hepatitis B vaccine at birth, 1 and 6 months of age. Universal hepatitis B immunization of all newborns began in February 1992.

Routine newborn screening for hemoglobinopathies now detects abnormal hemoglobins early in life. Clinically significant hemoglobinopathies such as SS and SC are present in some health center patients. These patients must be followed closely for compliance with immunizations, chronic antimicrobial prophylaxis, and the risk of overwhelming bacterial septicemia. Many more patients have less significant hemoglobinopathies, such as sickle or thalassemia traits. Hemoglobin AE or EE presents as a microcytic anemia and is often confused with the anemias of iron deficiency and elevated lead levels. Identification of these children is important, both to avoid confusion and to provide genetic counseling to the families who may be at risk of more significant hemoglobinopathies in future offspring (eg, E-thalassemia).

Children are seen frequently with significant respiratory illnesses, including asthma, bronchiolitis, viral, chlamydial and bacterial pneumonias, occasionally with empyema. Positive PPDs in our families often complicate the evaluation of these respiratory illnesses. Prior to universal maternal screening for chlamydia, newborns presenting with conjunctivitis and respiratory symptoms had to be evaluated carefully for chlamydial disease. Acute gastroenteritis also is seen frequently in this age group, and the differential diagnosis must include salmonella, shigella, camphylobacter, yersinia, traveler's diarrhea, and acute giardiasis. Typhoid fever has been seen in health center patients.

Recurrent otitis media is a significant health problem for many of our patients, affecting hearing and speech development and with the frequent presentation of an acutely ill, febrile child. A single course of Augmentin might represent almost 50% of many families' weekly take-home pay.

***ABBREVIATIONS USED***
***PAHCF: Providence Ambulatory Health Care Foundation, Inc.***
***PPD: Purified protein derivative***
***RPR: Rapid plasma reagin***

The number of abnormal tests for lead has increased since the Centers for Disease Control lowered the upper limits of normal from 25 to 10 ug/dl in 1992. Counseling and management for elevated lead levels has placed stress on already limited health center resources.

Iron deficiency remains a significant health problem among some ethnic groups primarily because of the prolonged and excessive use of the milk bottle and late introduction of solid food. The reasons for this vary culturally but should be addressed as a public health problem in view of the impact on pica, lead ingestion and future school performance. Iron deficiency is an example of a topic that is addressed in a variety of parent magazines read by middle-class mothers but unavailable to our patients because of cost and language barriers.

While some of these problems are not unlike those encountered in any pediatric practice, successful evaluation and treatment are dependent upon many variables, including transportation, money for medicine, the ability to read directions, knowledge of measurements, cultural views of illness, and the availability of trained medical interpreters.

## Factors Affecting Access

**Transportation:** Many of our patients are unable to keep appointments at health centers and with specialists because of lack of transportation. Patients often arrive at random hours, depending on ride availability. Public transportation may be too costly, unmanageable or unsafe for a single mother with several children. PAHCF's patient vans help to alleviate this problem.

**Telephone Management**: Telephone management is an integral part of most pediatric practices. PAHCF patients often do not have phones, but for those who do, there may not be a family member who speaks English well enough to provide a history. A typical phone call is shown below.

MD: Hello, this is Dr _____.
Pt: Baby sick.

Table 1—Maternal Risk Factors of Prenatal Patients at Providence Ambulatory Health Care Foundation, Inc. (n=1214)

| | |
|---|---|
| Foreign-Born Patients | 72% |
| Noncompliant with PPD Reading | 22% |
| Positive PPD | 35% |
| Positive Chlamydia | 12% |
| Teenagers 16-19 | 28% |
| No High School Diploma | 57% |
| Hepatitis B Carrier | 2% |
| Positive Gonorrhea Culture | 2% |
| Positive RPR | 2% |

MD: What is your baby's name?
Pt: Baby sick today.
MD: How old is your baby?
Pt: Baby cry too much.
MD: How old is your baby? When was your baby born?
Pt: Women & Infants Hospital.
MD: Thank you. What month was baby born? What day was baby born?
Pt: Oh. Baby 6 weeks old on Friday.
MD: Does he have a fever?
Pt: He no eat today. Cry too much.
MD: Is he hot? Can you take his temperature?
Pt: Head very hot. Hands cold.
MD: Can you take his temperature with a thermometer?
Pt: No. No. No. Cannot read.

During health center hours, interpreters are available to help obtain a better history. Most often, however, this baby would have to be evaluated in person. During open hours, we would see this baby at the health centers, but after hours such a patient would need to be seen in an emergency room, since the infant could have anything from a simple case of thrush to bacterial meningitis.

Phone management without interpreters can lead to tragedy, and many such infants need to be seen for more detailed evaluation.

**Cultural and Educational Variations in Parental Assessment of Illness:** Education, experience and cultural bias all affect parents' assessment and reactions to their children's symptoms. Many families have never taken a temperature, nor do they know the normal range and, even after a session of teaching, may state that they still cannot "see" the thermometer. Fever is often viewed as an entity to be controlled by acetaminophen, and not as an indicator of disease. For the neonate and younger children, many pediatric decision trees are based on whether the patient is truly febrile, and therefore, frustration arises when the mother cannot take a temperature.

Visible, minor illnesses often take precedence in the parents' mind over non-visible but serious illnesses. For example, it would not be unusual for a family to rush to the health center or to an emergency room for a case of ringworm because it is visible, and folklore states that children die after having a rash. In Third-World countries, children often die from gastroenteritis and respiratory illnesses, so it is not surprising when families seek care after only a few loose stools or at the onset of a respiratory illness. In their minds, they are trying to prevent a possible fatality. Conversely, it is common for a family to underestimate the consequences of a dysplastic hip, for example, since they cannot see it. Careful interpretation must be provided with adequate explanation of the risks of non-compliance. This is particularly important for families who have limited English proficiency, who understand some but not all information. We must be sensitive to the fear and confusion that these families have. It is hard for us to imagine what it would feel like to be ill in a foreign land where no one speaks English.

**Use of Interpreters:** Experienced interpreters are part of the health care team at the health centers and should be readily available in all other health care settings serving a multilingual population. Even families with limited English proficiency may need to use an interpreter to understand medical explanations clearly and to voice concerns. At times the family may not ask for an interpreter, but if a doctor cannot be sure that all questions have been asked and answered, he/she should insist upon interpretation. Some Southeast Asian cultures believe it is rude to ask questions. An interpreter can assist the provider in making sure there are no unanswered concerns.

**Case 1:** A 14-month-old Cambodian male came to the center following 2 days of vomiting, non-bloody diarrhea and fever. The bilingual health aide transcribed this information and then left temporarily. The mother spoke limited English. She reported that the baby was drinking and voiding well, with 3 loose stools and no vomiting that day. On exam the infant was quiet but alert, non-irritable, with a 103.8o temperature. Neck was supple, anterior fontanel was open and flat. Skin turgor was normal with no rashes. A bulging right tympanic membrane was noted. The rest of the exam was normal. It appeared that the baby would do well with oral hydration and Amoxicillin. When the interpreter returned, the provider decided to confirm the history. All of the above was accurate, but when the mother was asked if there was anything that she had not been able to convey, she stated the baby had a 3-minute seizure that morning. Because this was a first febrile seizure in a child who would need treatment for an otitis media, the decision was made to refer the child to the emergency room for spinal tap, which showed 12 WBCs with 90% polys. The child was admitted and grew meningococcus from blood and spinal fluid and shigella from the stool.

**Medication Cost:** It is important to determine, after a medical encounter, if the patient will be able to obtain the prescribed medication. Many patients will assure the provider that they will be able to buy the medication, but when asked when, they will state that they will be getting their pay check in 5 days, or that they have no ride to the pharmacy. Other families will not be able to purchase medication at all because of the high cost. This is particularly a problem for children with chronic illnesses such as asthma and recurrent otitis media.

**Subspecialty Access:** Because many PAHCF patients are served by Medicaid and are in need of translation services, private, subspecialty offices are not an option for many of these families. This places a burden on hospital-based subspecialty clinics and creates long backlogs for appointments. Further confounding the situation are those patients who do not keep appointments. Clearly this behavior is reduced if subspecialty clinics collaborate with the health centers in arranging appointments and transportation, so as to assure that the date and time are realistic for that patient. Those clinics that mail appointments in English, 3 or 4 months after the original referral was requested, will see a high "no show" rate as many patients have already moved, have no phone and cannot read the appointment slip. These patterns are of significant concern to PAHCF pediatricians because access to appropriate and timely subspecialists' evaluations may be crucial to the medical conditions of these children. To date, pediatric allergy and dermatology are the only subspecialty services that are available on site at the health centers.

**Teaching Tools:** Many inner-city mothers are young and single and have no extended family members who are experienced in child care, illnesses, accident prevention, or recognition of hazards such as chewing paint. Historically, multilingual teaching material on infant care has not been available to patients, nurses or medical staff during the postpartum period. Popular magazines, pamphlets or newspaper articles that may be of help to middle-class patients, are not a resource to many of our mothers. Some pamphlets that have been translated into Spanish and Portuguese may help those patients who can read at that level; video and audio tapes have been helpful to some others but are expensive and difficult to access.

## Approaches to Strengthening Access: Past, Present and Future

The availability of care at PAHCF, in many ways, represents a model of universal health care access. Successful access requires an understanding of the multiple needs of this ethnically diverse population, many of whom are single mothers with limited educational and social resources and often without health insurance. The comprehensive health care needs of this population extend beyond the capabilities of the traditional medical model. Providers must develop an understanding of habits, beliefs and customs that will not change overnight. Innovative approaches, such as culturally based case management teams may assist providers and patients in the process of understanding and educating each other.

At PAHCF, the special needs of Southeast Asian patients have been addressed through a supplemental program. Under this grant, a case management unit serves the Laotian, Hmong and Cambodian patients. Consisting of a nurse coordinator, a pediatric nurse, perinatal nurses, bilingual representatives, and an outreach worker, the unit has made a dramatic difference in the ability of the pediatricians to ensure that successful care is received by the Southeast Asian patients with complicated medical problems.

In 1991 a neonatal nurse coordinator was hired to improve the education that we provide new mothers regarding the care of their newborns. Using interpreters when needed, this nurse has begun to provide basic knowledge about newborn health and disease to health center mothers. She follows high risk newborns after discharge to ensure compliance with medical care and appointments.

PAHCF has worked with Brown University premedical students through an affinity group chaired by Dr John H. Moran, coordinator of pediatrics, and Mary Jean Francis, RNC, coordinator of Southeast Asian Health Care. Their group has printed educational pamphlets on the meaning of a positive PPD. The easy-to-read pamphlets have been translated into five languages.

PAHCF maintains a formulary of routine pediatric medicines that are provided to needy patients at a nominal cost. Various local banks and private foundations have helped our pharmacy program.

Recently, a new grant has provided PAHCF with preventive medicine clinics staffed by physicians from the Brown University International Health Institute and PAHCF. Not only will

this provide residents with an opportunity to experience a multiethnic practice, but it has expanded the appointment capabilities of several of the health centers, in meeting the immunization and preventive care needs of the Southeast Asian patients. In addition, these clinics have enabled PAHCF to counsel, in various languages, patients about their hemoglobinopathies and lead poisoning. Future funding may allow expansion of these services to other ethnic groups.

One private otolaryngology group has kindly volunteered to see PAHCF patients every other Wednesday morning at their office, relieving almost a year of virtually no ENT care for outpatients. Similar arrangements with hospital subspecialty clinics and private groups may help in other subspecialties.

Collaboration with the medical school, nursing schools and medical residency programs will teach students and residents about a type of outpatient medicine that encompasses a spectrum of diseases not commonly seen in the suburbs, that embodies the true definition of primary care and that clearly has made a difference in the health of children living in inner-city Providence.


## Acknowledgements

The authors would like to thank Lonice Thomas, MD, Esther Entin, MD, Stanley H. Block, MD, and Mary Jean Francis, RNC for their editorial advice and John Mertus, PhD for word processing assistance.



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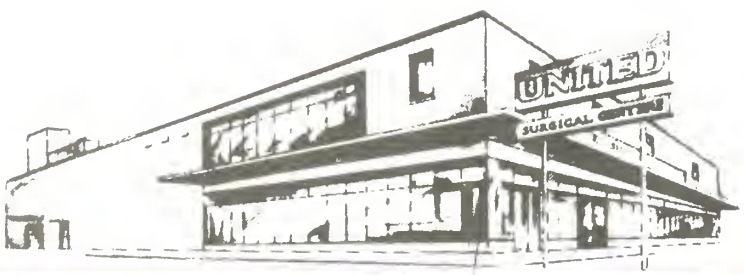


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# School-Based Health Care: An Inner-City Experience

Rosalind M. Vaz, MD
Arlene Greene, RN, MEd
Jane Griffin, MPH

***Some of the six schools with SBCs were able to reduce alcohol abuse, reduce absenteeism, increase dental visits, and delay the age of first sexual encounter, when compared with schools without SBCs but with similar demographics.***

The school-based health center movement has achieved considerable momentum during the past 5 years, increasing from the first clinic in 1970 to more than 300 nationwide today. These school-based clinics (SBCs) are usually located on middle or high school campuses, are staffed by professionals adept in adolescent care and are seen as an innovative way to provide care to adolescents with increasingly complex health care needs. Furthermore, by offering low-cost services on a confidential, walk-in basis, they address problems of access and confidentiality — barriers to adolescents who are seeking medical care.

Rhode Island's first school-based clinic, located at Central High School in Providence, opened February 1988. It is the result of a cooperative effort of the Providence Ambulatory Health Care Foundation, Inc. (PAHCF), the Rhode Island Department (RIDH) and the Providence School Department. Central High School Health Center (CHS-HC) is now in its 6th year of operation, enjoying continuing support from the Providence School Department administration, faculty, parents, and students of Central High School.

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Table 1.—Central High School Needs Assessment Demographic Characteristics (N=1043)

| | |
|---|---|
| **Age (%)** | |
| <14 | 11.3 |
| 15 | 24.2 |
| 16 | 27.1 |
| 17 | 21.8 |
| 18 | 12.3 |
| 19+ | 3.3 |
| **Gender (%)** | |
| Male | 51.2 |
| Female | 48.8 |
| **Ethnicity (%)** | |
| White | 25.5 |
| Black | 21.3 |
| Hispanic | 22.4 |
| Portuguese | 7.8 |
| Cape Verdian | 3.8 |
| Laotian | 8.4 |
| Cambodian | 7.4 |
| Hmong | 1.8 |
| Other | 1.6 |

## Funding Source

CHS-HC is operated by PAHCF and has been funded by an annual appropriation of the Rhode Island General Assembly to the RIDH. Initially funded at $100,000, it has since been cut to $64,000. The Providence School Department has provided $20,000 annually for the past 2 years to fund the position of a mental health counselor. (This position was cut for half of the 1990-91 school year, due to decreased funds.) The RIDH has recently allocated $5,000 to create a method of evaluating CHS-HC.

## Physical Layout and Staffing

CHS-HC is located in a renovated facility at Central High School. The clinic is staffed by a nurse who serves as clinic coordinator and is available on a daily basis to triage patients, enroll and register new patients and provide counseling as indicated. A pediatrician, trained in adolescent medicine is available 2 school days per week. She has four other clinics per week (two at the neighboring PAHCF health centers and two at Rhode Island Hospital), to which CHS-HC patients have access. A mental health counselor works 30 hours, 5 days per week. An HIV education counselor currently staffs the clinic during both physician sessions. During the summer, physical exam sessions are held at neighboring health centers for any school-aged child.

A consent form must be signed by

***ABBREVIATIONS USED***
***CHS-HC: Central High School Health Center***
***PAHCF: Providence Ambulatory Health Care Foundation, Inc.***
***RIDH: Rhode Island Department of Health***
***SBC: School-based clinics***

| Table 2—Central High Needs Assessment (N=1043) | | |
|---|---|---|
| **Health-Related Behaviors** | | |
| | Yes (%) | No (%) |
| Physical Checkup in Last Year | 71.1 | 28.9 |
| Eats Breakfast on School Morning | 30.0 | 70.0 |
| Eyes Checked in Last Year | 62.1 | 37.9 |
| Always Wears a Seatbelt | 18.0 | 82.0 |
| Usually Sleeps 8 Hours on School Nights | 50.4 | 49.6 |
| **Risk Taking Behaviors** | | |
| Ever Smoked Cigarettes? | 38.0 | 62.0 |
| Ever Driven Without a License? | 55.1 | 44.9 |
| Drink Alcohol? | 40.2 | 59.8 |
| Depressed Recently? | 40.6 | 59.4 |
| Ever Thought About Suicide? | 26.3 | 73.7 |
| Ever Attempted Suicide? | 9.2 | 90.8 |
| Ever Sexually Abused? | 4.8 | 95.2 |
| Ever Had Sex? | 53.0 | 47.0 |
| Ever Used Birth Control? | 71.1 | 28.9 |

a parent or guardian on all registered patients and is available in English, Spanish and Cambodian. Although there is no charge to individual patients, private insurance and Medicaid are billed when available. Clinic charts are confidential and stored separately from school health records.

## Data Collection

### *Health Needs Assessment*

In February 1988, a survey of Central High students was done to provide baseline information on their health and risk-taking behaviors (Tables 1 and 2). The 2-day survey yielded 1043 usable questionnaires from a population estimated to total 1800.

### *Clinic Users and Services Provided*

At patient registration, demographic data on age, sex, race, and socioeconomic status (by census tract) is obtained. Data table requests were made for school years 1988-89, 1989-90, 1990-91, and 1991-92 (Table 4). The Providence School System collects demographic information on its school registrants. Items from this Central High School data base obtained at the 1992 fall enrollment are presented in Table 4 and are used to compare student users of the health center to student non-users.

At the initial visit, all patients receive a complete medical and psychosocial history including mood, alcohol and drug use, and sexual activity. Patients who are sexually active are rescheduled for a gynecological exam. Patients are seen on a scheduled or a walk-in basis. Referrals are made by the school nurse, other school faculty, parents or clinic patients.

## Results

### *Health Needs Assessment*

Table 1 presents data on the demographic characteristics of the respondents. The sample was ethnically diverse, the average age was 16.1 years, and the gender distribution was nearly equal. Data on academic grades, not reported in Table 1 showed that 43% reported their "usual" grade to be "C," while 29% stated that they had repeated a grade in school at least once.

Table 2 presents data on self-reported health-related and risk-taking behaviors. Particularly striking were the findings related to psychological well-being: 41% admitted to being depressed recently, with 26% stating they thought about killing themselves. Additionally, only 18% always wore a seatbelt, only 30% ate breakfast on school mornings, and 50.4% got 8 hours of sleep on school nights. In terms of self-reports of sexuality, 53%

| Table 3—Characteristics of Students Who Use Central High School Health Center Compared to All Central Students | | | |
|---|---|---|---|
| **Characteristic** | **% School Health* (N=298)** | **% All Central Students** (N=1885)** | **p-Value** |
| **Age** | | | |
| 12-14 | 4.4 | 15.3 | <.001 |
| 15-17 | 64.6 | 72.3 | |
| >18 | 30.9 | 12.4 | |
| **Gender** | | | |
| Male | 29.3 | 53.4 | <.001 |
| Female | 70.7 | 46.5 | |
| **Race/Ethnicity** | | | |
| Black | 26.5 | 25.1 | .01 |
| Hispanic | 47.0 | 41.8 | |
| White | 12.1 | 17.4 | |
| Asian | 9.1 | 10.7 | |
| Portuguese | 1.7 | 3.3 | |
| Other | 3.7 | 1.7 | |
| **Socioeconomic***** | | | |
| Extreme Poverty | 65.9 | 60.5 | NS |
| Poverty | 13.1 | 12.2 | |
| Low | 18.3 | 24.1 | |
| Middle/High | 2.8 | 3.2 | |

* PAHCF Registration Database - School Year 1991-92
** Central High School Database - Fall Enrollment 1992
*** Based on Census Tract of Residence

of the respondents reported that they had ever had sex, with only 71% of those currently sexually active ever having used birth control.

In summary, the students were found to engage in many risk-taking and few health-related behaviors. This data helped target areas where counseling programs were needed.

### *Clinic Users*

**Characteristics of Students Who Use the Health Center**: There are currently 436 registered student users of CHS-HC, out of an overall student population of 1885. This represents 23% of the student population. Table 4 presents the demographic characteristics of the 298 students who registered as patients during the 1991-92 school year and of the total student body. The majority (64.6%) of the health center users are ages 15 to 17. Females represent 70.7% of the students who use the health center. Minorities make up the majority of clinic users (87.9%). Hispanic students make up the largest ethnic group comprising almost half the users. The majority of the students who use the health center (65.9%) come from extreme poverty areas of the city.

Table 3 compares the 15.8% of the students who use the health center to the rest of the Central High School students. The users are representative of the student body and in some cases represent an even higher risk group.

Students who use the health center are significantly older than all Central students. Only 12.4% of the Central students are 18 or older, yet that age group represents 30.9% of the health center users. Some of the age difference is due to how age is calculated on the PAHCF data base (ie, age at end of school year). However, even when this is taken into account, school health center users are older, on average, than all students at Central.

Female students are significantly more likely to use the school health center than males. Females make up only 46.5% of all students at Central, yet they comprise 70.7% of the Central High School Health Center users. This ratio of female to male users is similar to the ratio for 12 to 19-year-old users at all the PAHCF health centers. In 1991 female users at PAHCF made up 68% of the 12 to 19-year-old users, whereas males make up 32% in this age group.

Of Central High School's students, 82.6% are minorities. The school-based clinic attracts an even higher percentage of minorities for care (87.9%). Blacks and Hispanics are more likely than whites or Asians to use the school health center. Hispanics are the largest minority.

Students at Central High School come from the poorest area in the state. Sixty percent of the students come from the state's eight census tracts that have the lowest education levels and the lowest income levels. Table 3 shows that students who use the health center are more likely to come from extreme poverty and poverty areas of Providence than all Central students.

Table 4—PAHCF - Central High School Health Center Medical Visits and Services 1988-1992

| Type of Medical Visit/Exam | School Year 88-89 | 89-90 | 90-91 | 91-92 | Increase 1988-92 |
|---|---|---|---|---|---|
| Complete Physical Exam | 67 | 65 | 87 | 110 | |
| First Visit/New Problem | 206 | 188 | 197 | 180 | |
| Follow-Up Visit | 145 | 142 | 173 | 217 | |
| EPSDT | 14 | 26 | 38 | 64 | |
| Annual Gynecological Exam | 17 | 40 | 43 | 55 | |
| First Visit - Gyn | 17 | 32 | 36 | 36 | |
| Follow-Up Visit - Gyn | 19 | 42 | 68 | 55 | |
| Total | 485 | 535 | 642 | 717 | 47.8% |
| **Immunizations** | | | | | |
| TD | 42 | 28 | 46 | 78 | |
| MMR | 14 | 30 | 44 | 35 | |
| OPV | 16 | 8 | 12 | 23 | |
| Total | 72 | 66 | 102 | 136 | 88.9% |
| **Screening Tests** | | | | | |
| Pregnancy Test | 47 | 56 | 80 | 115 | |
| Stool (O&P) | 6 | 23 | 21 | 32 | |
| Breast Self-Exam | 21 | 18 | 26 | 47 | |
| Sickle Cell | 31 | 44 | 35 | 45 | |
| Hemoglobin | 68 | 75 | 100 | 150 | |
| Vision | 74 | 75 | 113 | 155 | |
| Blood Presssure | 178 | 202 | 230 | 340 | |
| PPD | 83 | 82 | 108 | 153 | |
| Total | 508 | 575 | 713 | 1037 | 108.2% |

### *Utilization of Health Services*

Table 4 shows the increase in visits and services over the 4 school years. In 1988 there were 485 medical visits, and in 1992 this number increased 47.8% to 717 exams. Most of the growth was due to an increase in complete physical and gynecological exams. Screening tests increased 108.2% from 1988 to 1992. Vision and tuberculosis screening contributed the most to this rise. It should be noted that this data is only recorded in the PAHCF data system if the patient is a registered user. The nurse coordinator conducts screening tests on a walk-in basis and records the results in a separate log.

### *HIV Counseling*

Table 5 summarizes demographic characteristics (by sex, age and race), of students who received HIV counseling. There were 159 students seen

| Table 5—Characteristics of Students Receiving HIV/AIDS Counseling at Central High School Health Center Sept. 30, 1991-June 6, 1992 (N=159) | |
|---|---|
| **Sex** | |
| Females | 71% |
| Males | 29% |
| **Race/Ethnicity** | |
| White | 14% |
| Black | 25% |
| Hispanic | 43% |
| Asian | 9% |
| Other | 9% |
| **Age** | |
| 13-17 Yrs. | 61% |
| 18-24 Yrs. | 39% |

by the HIV counselor during one 9 am to noon session per week during the 1991-92 school year. All students who came in for a physician visit were invited to receive counseling. However, because of schedule constraints on the part of the students, time constraints on the part of the counselor, or student refusal, not all students seen by the physician received counseling. The students who were seen represent the clinic population, with the majority being between 13 to 17 (71% being female and 43% Hispanic). Out of the 159 students counseled, 3 opted for HIV testing.

### *Mental Health Counseling*

Tables 6 and 7 reflect hand-tabulated data that describe demographic characteristics of students and types of mental health encounters seen by the counselor during the 1991-92 school year. There were 215 students seen, for a total of 820 student sessions. Sixty-four parental sessions were also held by the counselor. Of the students seen, 106 needed referrals to other child welfare agencies in the community.

As seen in Table 7, students were seen most often for suicidal ideations, family relationship issues and general adolescent issues. In addition, as previously identified in our health needs assessment survey, students sought help with problems arising from drug and alcohol abuse, and physical and sexual abuse. Fifteen percent of all student sessions involved counseling related to drop out prevention — an important service in a school system with a 32% high school dropout rate.

## Discussion

These data shows that CHS-HC effectively targets students who "are most economically depressed and who have measurably higher health risks and unmet health care needs," as required by the General Assembly act. The health risk assessment survey showed the low incidence of health-related and high incidence of risk-taking behaviors in our population.

In terms of medical services provided, in 1991-92 20% involved reproductive care. This is consistent with the Center for Population Options survey of SBCs nationwide, where fewer than 25% of 1989 clinic visits were related to reproductive health.[4] It negates the controversial images of SBCs as being "sex clinics," since the majority of services provided meet other medical or mental health needs. Many SBCs, to avoid controversy, have stopped prescribing contraceptives and refer their students to local agencies.

| Table 6—Central High School Health Center Mental Health Counseling Clientele Demographics October 1991-June 1992 (N=215) | |
|---|---|
| **Sex** | |
| Females | 65% |
| Males | 35% |
| **Race/Ethnicity** | |
| White | 8% |
| Black | 10% |
| Hispanic | 60% |
| Haitian | 12% |
| Asian | 6% |
| Other | 4% |
| **Grade** | |
| 9 | 40% |
| 10 | 20% |
| 11 | 20% |
| 12 | 20% |
| **Age** | |
| 13-15 Yrs. | 40% |
| 16-18 Yrs. | 45% |
| 19-20 Yrs. | 15% |

| Table 7—Central High School Health Center Types of Mental Health Encounters October 1991-June 1992 (N=820) | |
|---|---|
| Suicidal Ideations | 80% |
| Family-Relationship Issues | 5% |
| Adolescent Issues | 60% |
| Drug and Alcohol Abuse | 35% |
| Physical Abuse | 25% |
| Runaways or Potential Dropouts | 15% |
| Sexual Abuse | 10% |
| Neighborhood Terrorism | 5% |

The decision not to provide contraceptives at CHS-HC was made at the onset, since to do otherwise might threaten the clinic's funding and approval.

During the past 4 years, while the number of users has remained fairly constant (289 in 1988 and 297 in 1992), there was a 47.8% increase in medical services provided, an 88.9% increase in immunizations given and an 89.2% increase in screening tests done. With the current part-time medical personnel, it appears that the clinic capacity is between 250 and 300 students. However, these students are being provided with more services. These data also show that male users decreased from 108 in 1988 to 87 in 1992, while Hispanic students increased from 234 in 1992 to 787 in 1992, a 236% increase. This increase reflects the increase of Hispanic students enrolled at Central High School.

HIV education has been well accepted by the clinic patients. All patients are offered counseling regarding all sexually transmitted diseases, regardless of their sexual activity. All students were offered HIV testing, 2% got tested and all returned for their test results.

The services provided by the mental health counselor reflect the psychological profile of the Central High School population described in the health risk assessment survey. The rate for drug and alcohol abuse encounters (35%) does not accurately reflect the problem, since a drug and alcohol abuse counselor hired by the

Providence School Department has been providing the majority of these services during the 1991-92 school year. An important function of the counselor has been to make students and parents aware of mental health agencies in the community, enabling them to access these services more easily as adults. The introduction to medical services available in the community is another important service of the clinic. All clinic patients leave the school as registered patients of PAHCF and are eligible for and familiar with its medical and preventive services.

An important area to address regarding SBCs is future funding. Many SBCs like CHS-HC are affiliated with neighborhood health centers and have systems in place to bill Medicaid and private insurance. Many patients, however, have no health insurance. Furthermore, as SBCs often rely on students and parents to provide insurance information voluntarily, this information is often withheld or inaccurate. The CHS-HC generates slightly over 10% of its budget from third-party payments. Given the high percentage of students who come from a background of extreme poverty, many more students may be eligible for enrollment in medical assistance. The availability of a family resource counselor to CHS-HC may help reduce the number of uninsured patients. The inability of our clinic to support itself on patient generated revenue is consistent with national experience.[5,6]

A new patient encounter form implemented in January 1992 for both medical and mental health visits will provide us with longitudinal data regarding the patient diagnoses and services provided. Data evaluating the success of SBCs are difficult to obtain because of the transient nature of the clinic population. A recent study by the Center for Population Options compared health indicators at six schools with SBCs with six schools without SBCs.[7] Some of the six schools with SBCs were able to reduce alcohol abuse, reduce absenteeism, increase dental visits, and delay the age of first sexual encounter, as compared with schools without SBCs but with similar demographics. Most importantly, the study also demonstrates that aggressive outreach within the school and strong community support are important factors in ensuring the success of a SBC. Aggressive outreach efforts (classroom presentations, health fairs) are possible only with increased staffing. At CHS-HC we are fortunate to have broad-based support from the community, the school system and state agencies.

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# Inner-City Asthma: An Allergist's Perspective

Stanley Hoyt Block, MD

***Among children, studies have found poverty to be associated with increased hospitalizations for asthma.***

As new and potent medications for asthma have become available, most asthma specialists expected a decline in mortality and morbidity from this disease. Yet the reverse seems to be occurring. The prevalence, hospitalization rate (Figure 1) and mortality (Figure 2 and Table 1) from asthma have all increased over the past decade.

In 1987, there were more than 450,000 hospitalizations, nationwide, in which asthma was the first listed diagnosis. Hospitalizations for asthma, as well as mortality from this disease have been increasing among children. For example, from 1979 to 1987, the hospital discharge rate with asthma as the first-listed diagnosis rose 43% among children less than 15 years of age, from 19.8 to 28.4 discharges per 10,000 population.[1] Among children, studies have found poverty to be associated with increased hospitalizations for asthma.

Blacks have asthma-related mortality rates that are higher than those of whites, especially among younger people. The mortality rate in black Americans has increased significantly during the past decade. In 1979, blacks of both sexes were about twice as likely to die of asthma as whites. By 1987, the asthma death rate for all ages was almost three times higher among black Americans than whites, and in younger age groups (15 to 44 years of age), blacks had death rates at least five times higher than their Caucasian counterparts.[1] Puerto Rican children also suffer disproportionately, and for unknown reasons, from asthma. Ten percent of Puerto Rican children have active asthma, and one in five will have it some time during his or her life time.[2] Nationwide, $6.2 billion, or nearly 1% of all US health care costs were attributed to asthma in 1990.3

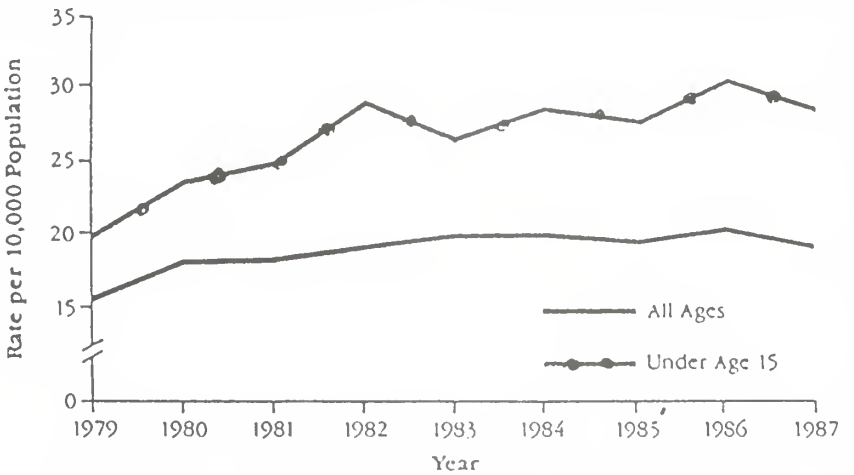


Fig 1.—Trends in hospitalizations for asthma. *Source: National Hospital Discharge Survey, National Center for Health Statistics*

According to the Expert Panel Report,[1] mortality from asthma may result from inadequate medical management, ie, lack of appreciation of severity of disease by patient or physician, psychological disruptions (anxiety, depression, hopelessness, despair, unemployment, etc.) that prevent the patient from obtaining adequate care; and lack of access to medical care. In some urban centers, more than half of the children with asthma may receive their entire asthma medical care in an emergency department, without enrollment in the chronic, continuous asthma medical care program so necessary to manage this difficult, chronic disease. This is particularly true for the underinsured or uninsured populations .[1]

Many of the above precipitants of fatal asthma are found in inner-city Providence. Many blacks, Puerto Ricans and Southeast Asian patients living in poverty and often uninsured, suffer from asthma in Providence. Fortunately, the Providence Ambulatory Health Care Foundation, Inc. has operated an asthma/allergy clinic for more than 15 years at one of its central

Table 1.—US Asthma Mortality (Number Deaths per Year)

| | |
|---|---|
| 1979 | 2598 |
| 1980 | 2891 |
| 1981 | 3054 |
| 1982 | 3154 |
| 1983 | 3561 |
| 1984 | 3564 |
| 1985 | 3880 |
| 1986 | 3955 |
| 1987 | 4360 |
| 1988 | 4597 |
| 1989 | 5150 |

Source: National Center for Health Statistics

***ABBREVIATION USED***
***FDA: Food and Drug Administration***

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sites, ie, Capitol Hill Health Center, where poor patients with severe, chronic asthma are referred from all five health centers for care by the allergist and nurse practitioner.

Treatment of chronic asthma at Capitol Hill Health Center is comprehensive in nature and scope and includes those broad areas outlined in the Expert Panel's recommendations1, such as patient education, nonpharmacologic therapy (eg, environmental control, avoidance, immunotherapy, etc.), pharmacologic treatment (emphasizing anti-inflammatory medications), and objective measurement of peak flow at home and in the office. Although these general areas of management are the same in the inner-city as elsewhere, the emphasis is often different due to the particular circumstances of the inner-city poor.

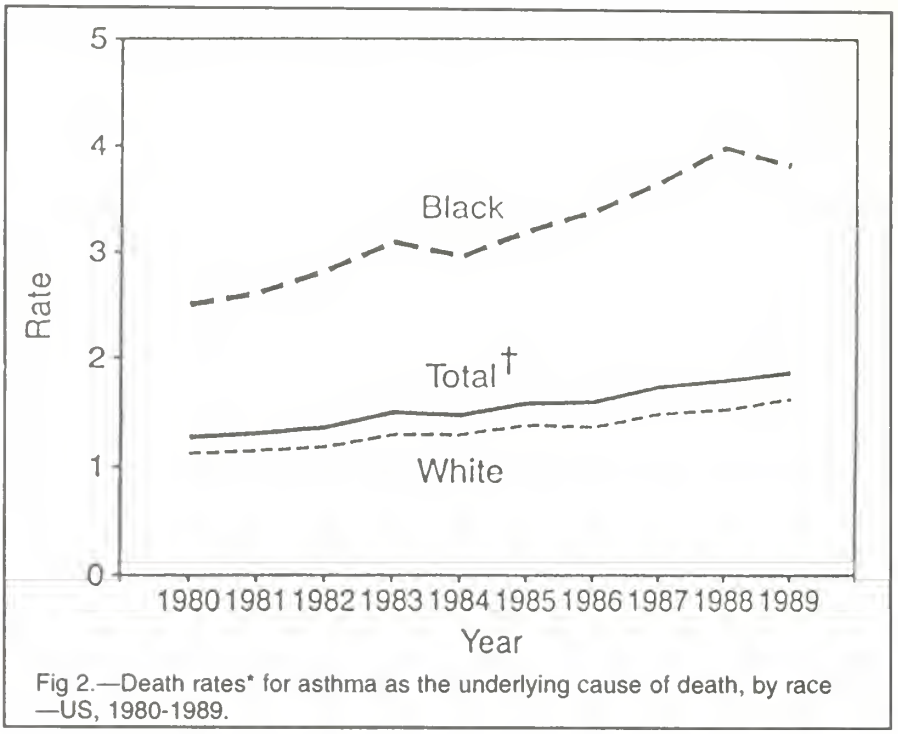


Fig 2.—Death rates* for asthma as the underlying cause of death, by race —US, 1980-1989.

* Per 100,000 persons, age-adjusted to the 1980 US population.
+ Includes all races/ethnicities.

## Patient Education and Nonpharmacological Therapy

Education on the nature and course of chronic asthma is made particularly difficult by the fact that more than half of our patients speak little or no English, requiring interpreters for all educational intervention. Nevertheless, the educational aspect of our program is critical; patients must know the nature of their chronic disease, measures to take to keep it under control and action needed for exacerbations.

Environmental control, ie, the avoidance of allergens and airway irritants, is a central component of allergic management, but is exceedingly difficult to accomplish in the inner-city. Indoor allergens, such as dust mite and cockroaches, are difficult and costly to avoid. Control of dust mite allergen includes special allergic coverings for the box spring, mattress and pillows — which are a financial problem for an indigent family. Furthermore, most poor families who rent apartments are unable to pull up carpeting that collects dust mite and animal antigens. Nor can they afford the tannic acid solution that denatures dust mite allergen, nor the acaricides such as benzyl benzoate. Cockroaches, a very common allergen in older inner-city homes, and a significant trigger for asthma attacks in some patients, are almost impossible to eliminate. Roaches often can be kept under only partial control with continued professional fumigation. Unfortunately, even the dead cockroach parts can continue to be allergenic. Families often refuse to part with dogs, due to security concerns.

***Nationwide, $6.2 billion, or nearly 1% of all health care costs, were attributed to asthma.***

One environmental intervention that is difficult, but at least possible, in the inner-city is to proscribe smoking by family or friends in the home environment. Tobacco smoke is a known irritant to asthmatic children and is particularly important to avoid, since so many other environmental changes are expensive or impractical for families in the inner-city. Smoking cessation saves our families money — a remarkable health and economic benefit for families of limited economic means.

Immunotherapy is used by many allergists for their asthmatic patients with a significant atopic component to their disease. At our inner-city Asthma Clinic, immunotherapy is used much less frequently than in many private practices. Immunotherapy (allergy shots), have many problems in the inner-city that may make them less desirable than other modes of treatment. First, the patient needs to be quite compliant with appointments in that the schedule, if interrupted, can lead to increased risks of reactions or a much slower build-up of doses. The regimen must be started over when the patient fails to keep appointments for a significant period of time. Secondly, patients must wait a specified period of time in the waiting room after injections so that reactions can be treated immediately; many of our patients do not wait as requested, increasing the risk of reactions, should they occur. Thirdly, the vast majority of our asthmatic patients are reasonably well controlled by avoidance, pharmacologic approaches and careful education, thus making immunotherapy (with its small but real risk of systemic reactions) unnecessary. Although immunotherapy is not frequently utilized in

our asthma clinic, allergy skin tests are done quite routinely to help us determine which avoidance measures and environmental alterations should help the most.

## Pharmalogic Therapy

The Expert Panel Report1 emphasizes the need for anti-inflammatory medications for all asthmatics with more than mild disease. Anti-inflammatory asthmatic medications include cromolyn and steroids. In children, cromolyn is usually tried first and often works. However, infants and young children require a nebulizer (such as a Pulmoaide) to use cromolyn solution, since they are not yet able to use metered dose inhalers. Fortunately, patients covered by Medicaid are able to obtain the nebulizer through the Medicaid Program. Although cromolyn solution is FDA-approved for children over 2-years-old, we have many infants with chronic asthma well under 2 years of age, who are benefiting from this safe and effective prophylactic asthma medication. When their asthma "breaks through," an inhaled beta agonist (eg, albuterol inhalant solution) is added to the cromolyn and administered by the nebulizer to such infants and children. The use of home nebulizers avoids many urgent trips to the emergency room — a great savings in both time and money.

***Education on chronic asthma is made particularly difficult by the fact that more than half our patients speak little English . . .***

Inhaled steroids are used in our children for maintenance, when cromolyn does not suffice. Beclomethasone, which comes as a metered dose inhaler, is usually administered with a spacer device (such as an Aerochamber or Inspirease). For older children and adults, "break-through" wheezing is treated with an albuterol metered dose inhaler (eg, Ventolin or Proventil).

An enormous effort is made to educate our patients as to the prophylactic nature of cromolyn and beclomethasone, since the patients are otherwise disappointed when they do not feel a rapid effect, as they do with albuterol or other beta agonists. Through our Spanish, Cambodian, Hmong, Lao, and Portuguese interpreters, patients at our asthma/allergy clinic are taught how to use their nebulizers (Pulmoaide machine), how to use a metered dose inhaler correctly, how to use a spacer (Aerochamber or Inspirease), the need to take inhaled anti-inflammatory asthma drugs (cromolyn or beclomethasone) regularly, and when to take their beta agonists for increased symptoms. They are taught how to react during emergencies (including appropriate use of the emergency room, and how to call rescue when needed).

We use theophylline mainly as a supplemental drug, added regularly, for those patients whose asthma remains uncontrolled with cromolyn and/or beclomethasone. Theophylline is difficult to use in the inner-city because patients are often non-compliant, may not get theophylline levels, may under-use or over-use this medicine, and are at increased risk of drug-drug interactions if they use several sources of health care. Nevertheless, many of our patients require round-the-clock theophylline as well as the maintenance anti-inflammatory medications already discussed; great efforts are then made to help the patient understand the need for regular dosage, careful follow-up of theophylline levels, the risk of drug-drug interactions, and the side effects to watch for that might indicate toxicity. This is no minor feat, when Cambodian, Hmong or Lao interpreters must be used. There often are no words in the patient's own language to describe concepts being discussed. Pictures, demonstrations and lengthy explanations may help.

Despite the enormous difficulties in teaching non-English-speaking families of severe asthmatics about equipment, medications and avoidance, it is quite remarkable how many patients (including some Southeast Asians who came from very primitive tribal cultures overseas) learn to provide excellent modern care for their asthmatic children. In fact, some of the Southeast Asian families, who may not have had electricity in their home country, are the most diligent in providing their children with regular prophylactic nebulization treatments of cromolyn by a Pulmoaide machine, once they understand the preventive nature of such anti-inflammatory medications.

***Environmental control . . . is a central component of allergic management, but is exceedingly difficult to accomplish in the inner city.***

One severe problem that many of our patients face is the cost of the medications needed to control their asthma. All too often, children who are well controlled on inhaled cromolyn, beclomethasone and/or oral theophylline require hospitalization for status asthmaticus when their parents run out of money towards the end of the month and cannot afford to purchase needed medicines. Fortunately, several Rhode Island banks (including Old Stone, Citizens and Rhode Island Hospital Trust) and several private foundations (including The Rhode Island Foundation and Hazard General Charity Fund) have donated funds to enable our health centers to purchase some of these critical pharmaceuticals for our many indigent patients. Samples from pharmaceutical companies have helped many other patients to tide them over until their next pay check. Nevertheless, the cost of medicine remains a critical problem for all too many asthmatics, and many unnecessary hospitalizations occur simply because our patients cannot afford the cost of medicines that they need to stay well. Such hospitalizations are tragic for the child and costly to society.

## Objective Measurements of Peak Flow

The Expert Panel Report1 emphasizes the need for patients with chronic asthma to use peak flow meters at

home to better understand the status of their asthma. Home peak flow monitoring can detect early stages of airway obstruction, allowing the patient to initiate additional treatment before the obstruction becomes more serious. It also allows patients to know when emergency medical care is needed and provides feedback to patients who have poor perception of the severity of their obstruction.

Most chronic asthmatics at our asthma clinic are taught the technique of home peak flow monitoring, usually with an Assess Peak Flow Meter or a Pulmograph Peak Flow Machine. These are obtainable through the Medicaid program for those so covered, and were (but are no longer) available through Fisons Corporation (the manufacturer of Intal) free-of-charge to those patients on cromolyn.

## Outcome

To the best of the author's knowledge, no deaths from asthma have occurred among the large number of chronic asthmatic patients followed in the Capitol Hill Health Center Asthma Clinic over the past 15 years, despite the increased risks of poverty and environment. We hope that the efforts provided by our inner-city asthma program will continue to allow our asthmatic patients to control their disease, despite the national increase in morbidity and mortality described above.

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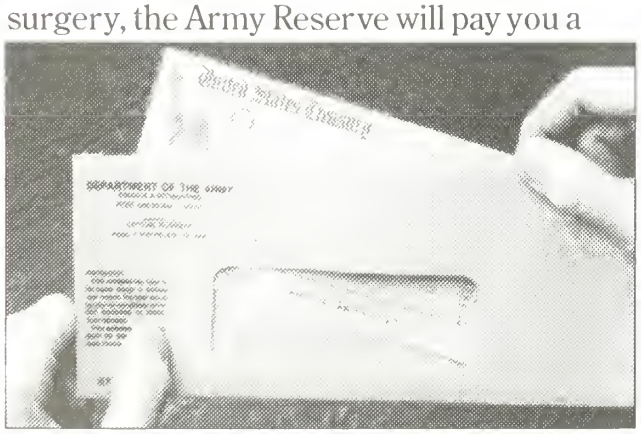

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# Inner-city Breast and Cervical Cancer Screening: A Cooperative Report

Marie Ghazal, RN, MS
Linda M. Tetu-Mouradjian, RN
Anne Jones, MSW
Stanley Hoyt Block, MD

***Progress is being made. Over a tenth of eligible women have received screening mammography since the project's inception, and a number of breast cancers have been detected and treated.***

## The Problem

In Rhode Island, women of lower income are far less likely than women of higher income to be screened for breast and cervical cancer. In 1989, for example, only 72% of women 40 and over with family incomes less than 200% of the federally defined poverty level, had received a Pap test in the past year, and only 35% had been screened for breast cancer. In comparison, of women 40 and over with higher family incomes, 93% had received a Pap test in the past year, and 51% had been screened for breast cancer. A recent analysis of this problem revealed the importance of access to regular, preventive gynecological care as a determinant of women's cancer screening, underscoring the special barriers to access encountered by minority low-income women.1

Less than adequate screening takes its toll in avoidable deaths. For example, breast cancer mortality is 13% higher among black women than white women in Rhode Island, even though breast cancer incidence is probably lower among blacks than whites, and cervical cancer mortality is 203% higher among black women than white women.2 The latter is especially tragic, since cervical cancer deaths are considered avoidable. [3]

*Marie Ghazal, RN, MS is director of maternal and child health at the Providence Ambulatory Health Care Foundation, Inc. (PAHCF). Linda M. Tetu-Mouradjian, RN, BS is community health nurse coordinator for the Women's Cancer Screening Program at the Rhode Island Department of Health (RIDH). Anne Jones, MSW is administrator, Office of Chronic Disease Prevention and Health Promotion at the Rhode Island Department of Health. Stanley Hoyt Block, MD is medical director at Providence Ambulatory Health Care Foundation, Inc.*

## A Cooperative Response

The Providence Ambulatory Health Care Foundation, Inc. (PAHCF) works with other community agencies to increase rates of breast and cervical cancer screening among its female patients over 40. The 5-year effort is funded by the National Cancer Institute (NCI), with the cooperation of the Rhode Island Department of Health (RIDH), the Rhode Island Division of the American Cancer Society (ACS), Roger Williams Cancer Center (RWCC), the Rhode Island Hospital (RIH), and Women & Infants Hospital (WIH). RIDH has helped with surveillance, training, scheduling of mammography and evaluation. ACS has raised funds to pay for mammograms among uninsured women, and RWCC, RIH and WIH have agreed to provide free follow-up treatment, as necessary, for the same group. The project has a seven part strategy:

1. Perform baseline surveillance on women's cancer screening to ascertain current levels and to look for differentials among patient groups.
2. Provide in-service training for PAHCF staff women's cancer screening.
3. Implement preliminary interventions to maximize women's cancer screening within the current system of care for women 40 and over.
4. Convene a planning group to identify barriers to women's cancer screening within the PAHCF system and to suggest ways in which barriers may be reduced.
5. Reduce barriers to women's cancer screening in the PAHCF system.
6. Perform follow-up surveillance to evaluate the impact of interventions.
7. Conduct a media campaign to support all PAHCF women's cancer screening activities.

## Baseline Surveillance

Initially, the medical charts of all eligible patients (women 40 and over who had visited a PAHCF community health center at least once since 1989) were reviewed, to establish baseline screening statistics. A total of 3265 charts were abstracted in five community health centers between March 1991 and March 1992. The abstracts contained information on socio-demographics and health care utilization, focusing on women's cancer screening.

Between 441 and 852 women were identified in each of the five centers. About a third of the women were identified as white, with no other ethnic

***ABBREVIATIONS USED***
***ACS: American Cancer Society***
***NCI: National Cancer Institute***
***PAHCF: Providence Ambulatory Health Care Foundation, Inc***
***RIDH: Rhode Island Department of Health***
***RIH: Rhode Island Hospital***
***RWCC: Roger Williams Cancer Center***
***WIH: Women and Infants Hospital***

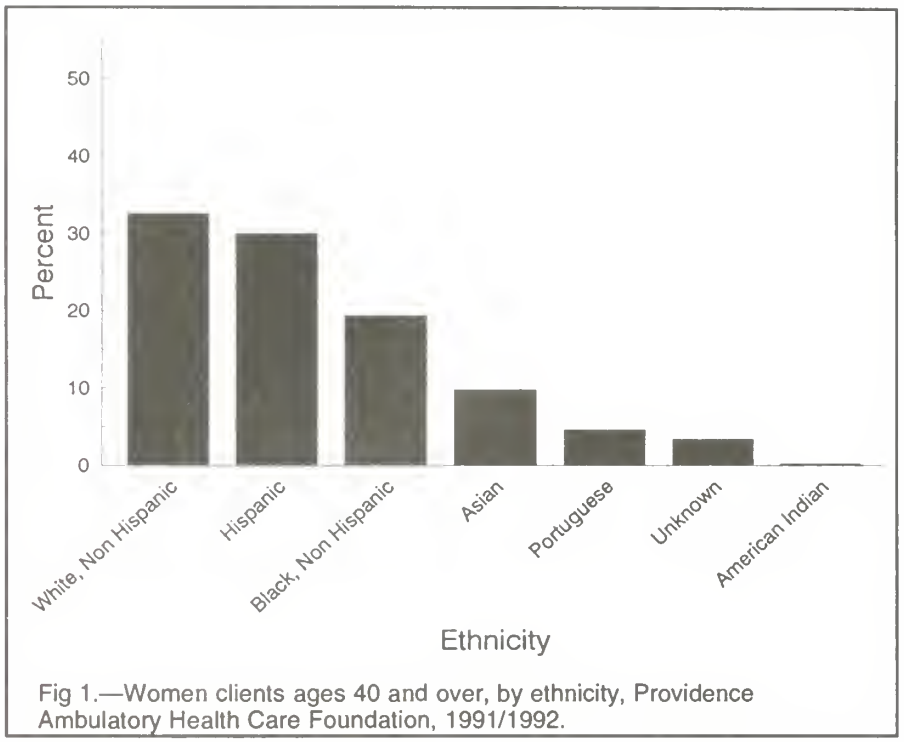


Fig 1.—Women clients ages 40 and over, by ethnicity, Providence Ambulatory Health Care Foundation, 1991/1992.

descriptor. The next largest group, 29% of the total, was Hispanic. Blacks represented about a fifth of the total (19%), Asians (mostly Southeast Asians) represented a 10th, and persons of Portuguese heritage represented a 20th (Figure 1). Half the women had a primary language other than English (Figure 2). Sixty-five percent of the women were under age 60; only 16% were above age 69 (Figure 3).

In the year preceding the review, only 14% of the women had received a physical breast exam, 5% had received a mammogram, and 9% had received a Pap smear (Table 1). Little variation in screening utilization was found among health centers. Large differentials in the receipt of breast physical exams and Pap tests were found by age group. The proportion of women who had received a breast physical exam in the past year, for example, ranged from 24% for women ages 40-49 to 4% for women ages 80+. Smaller differentials in the receipt of mammograms were found by age group. Moderate differentials in screening utilization were observed among ethnic groups. In general, Hispanic and Portuguese patients were more likely to have been screened, possibly because the women in these groups are younger on average than women in the other ethnic groups and make more visits to the health centers. Reasons for lack of screening included economic difficulties (inability to afford mammograms), language and cultural barriers, lack of understanding of their importance, noncompliance with appointments or no physician recommendation.

## In-service Training

In conjunction with the RIDH, PAHCF held an in-service training program for its nurse practitioners, nurses and health aides on women's cancer screening. Breast models and video tapes on self-breast examination and screening mammography were demonstrated. These materials were distributed to each of the five health centers at the time of the in-service training. A breast cancer screening manual was produced to use as a reference and to orient new providers and staff.

## Preliminary Interventions

Providers have been asked to ensure that all eligible women receive screening. Cancer screening records have been stamped on the covers of medical charts to aid providers in referring patients. Gynecological exams are scheduled for PAHCF's Gyn Clinic; free out-of-house mammography referrals are made through RIDH's Women's Cancer Screening Program. Motivational posters and brochures have been developed to encourage them to do so. Finally, a mail intervention is being piloted at one of the health centers; eligible women re-

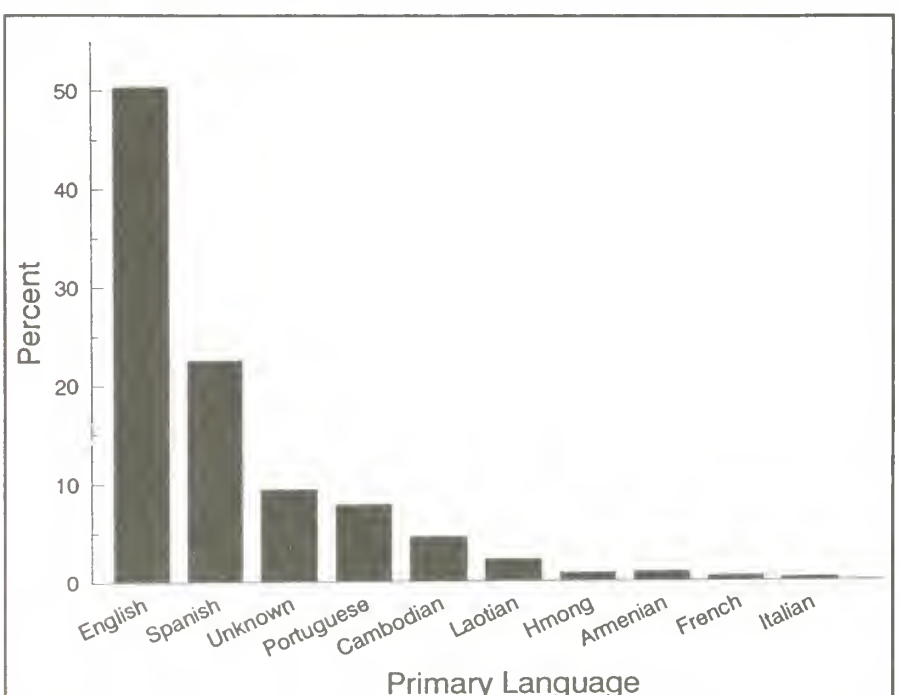


Fig 2.—Women clients ages 40 and over, by primary language, Providence Ambulatory Health Care Foundation, 1991/1992.

Table 1.--Percentage of female health center patients ages 40 and over who had received screening tests in the past year, by demographic characteristics, Rhode Island, 1991-1992 (N=3265)*

| Characteristic | Percentage Breast Exam | Mammogram | Pap Test |
|---|---|---|---|
| **Health Center** | | | |
| One | 11 | 5 | 7 |
| Two | 14 | 6 | 10 |
| Three | 14 | 4 | 8 |
| Four | 14 | 4 | 10 |
| Five | 16 | 6 | 11 |
| **Race** | | | |
| White, Non-Hispanic | 10 | 4 | 7 |
| Hispanic | 18 | 6 | 13 |
| Black, Non-Hispanic | 10 | 4 | 6 |
| Asian | 13 | 4 | 7 |
| Portuguese | 24 | 6 | 15 |
| Other | 13 | 6 | 13 |
| **Age Group** | | | |
| 40-49 | 24 | 8 | 17 |
| 50-59 | 17 | 7 | 9 |
| 60-69 | 8 | 6 | 4 |
| 70-79 | 6 | 3 | 1 |
| 80+ | 4 | 0 | 0 |

Source: Abstracts of medical records at five inner-city health centers, 1991-1992, Rhode Island Department of Health.
* Among women ages 40 and over who had visited a PAHCF community health center at least once since 1989.

ceive a letter from the director of the PAHCF Gyn Clinic, informing them that they are due for preventive care, explaining its importance and requesting that they make an appointment.

## Barriers to Screening

A planning group was convened to identify barriers to women's cancer screening in the PAHCF system and to suggest ways in which barriers may be reduced. Members include PAHCF providers, clerical staff, administrators, board members, and clients, joined by RIDH staff. Findings and recommendations will be presented to PAHCF leadership for discussion, modification and approval. The planning group will provide advocacy for changes approved by PAHCF leadership, perhaps piloting them at one health center before implementing them throughout the system.

## Follow-up Surveillance

Surveillance of women's cancer screening at PAHCF health centers will be repeated in the 5th year of the project, after preliminary interventions and barrier reductions have had a chance to work. The medical charts of eligible women will be reviewed, similar to baseline reviews, although a sample will be designed to contain surveillance costs. Additionally, providers, staff and clients will be interviewed to develop a better understanding of how interventions have affected each group.

## Media Support

A media campaign was planned in collaboration with RIDH to support all PAHCF women's cancer screening activities. Posters and brochures in multiple languages have been produced for use in the health centers. These visuals have been designed not only to educate and motivate clients, but also to focus providers and staff on the project and the importance of their roles in making it a success.

## Conclusions

The importance of this project is underscored by baseline surveillance results. Most women 40 and over who use the PAHCF system need to be screened more frequently. Financial, cultural and language barriers to screening need to be eliminated.

Women 40 and over must be educated about the need for preventive gynecological care, motivated to demand it and helped to keep appointments for their Pap smears, mammograms and follow-up visits.

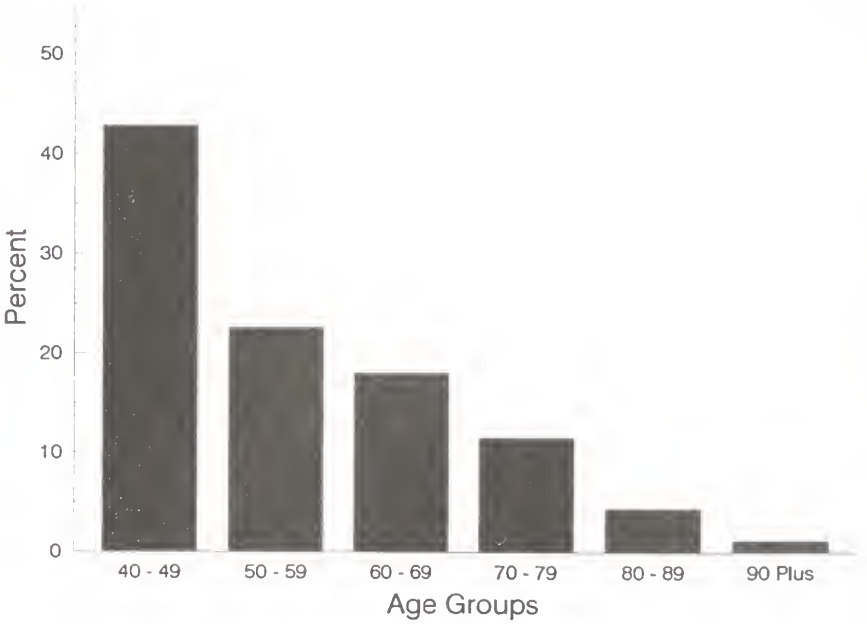


Fig 3—Women ages 40 and over, by age group—PAHCF 1991-1992.

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Physicians are encouraged to refer their eligible patients to this program.

**Provider referral is consistently reported as the single most important reason for having screening mammography.**

Primary care providers must be encouraged to refer eligible women for preventive gynecological care and screening mammography and these services must be available and affordable to poor and minority women.

Progress is being made. More than 1 of every 10 eligible women have received screening mammography since the project's inception, and a number of breast cancers have been detected and treated. Similar progress has been made in screening women for cervical cancer. The partnership of agencies has worked and promises a brighter future for women's health care in Rhode Island.

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**References:**

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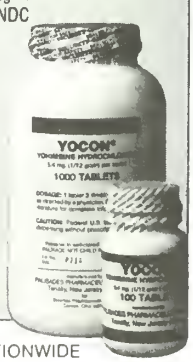


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# Domestic Violence: An Inner-City Perspective

Marie Ghazal, RN, MS
Stanley Hoyt Block, MD

***For many women, the Providence Health Centers may be their only contact with a primary care provider and interpreter, without the presence of their abuser.***

## Background

Domestic violence is recognized as one of the most critical issues facing women today. It is the leading cause of injury in the home for women between the ages of 15 and 44.1 In the United States, more than 1 million domestic assault cases are reported annually, and an additional 3 million violent cases go unreported. About 8 to 12 million women in the country are at risk of being abused — nearly one quarter of all women in the United States.2 On the basis of these statistics and others (Table 1 and Table 2), it is no surprise that the US Surgeon General has declared domestic violence a true public health epidemic.

Women, particularly those within childbearing ages of 15 through 45, comprise 32% of patients using the Providence Ambulatory Health Care Foundation, Inc. (PAHCF). (See Table 3).

The majority of these females are Hispanic or black and, economically, are at or below the federally defined poverty level. Of the 1214 new prenatal patients in 1991, 69% were single heads of household and 72% were born outside of the US. A total of 700 (58%) never obtained a high school diploma or equivalency.

Poverty, unemployment, substance abuse, isolation, and fear of deportation of undocumented aliens, are prevalent risk factors among PAHCF female patients. These factors and the diverse cultural interpretations of the problem make domestic violence a major concern and challenge at PAHCF. It should be noted, though, that abuse is found in all socioeconomic strata.

*Marie Ghazal, RN, MS is director of maternal and child health at Providence Ambulatory Health Care Foundation, Inc. (PAHCF), which operates five community health centers in inner-city Providence, Rhode Island. Stanley Hoyt Block, MD, is medical director, PAHCF, Inc.*

Table 1.—Domestic Violence Facts

Approximately 95% of the victims of domestic violence are women
35% of emergency room visits for women are for symptoms of ongoing abuse.
85% of all women with disabilities have been victims of domestic violence.
25-37% of all pregnant women are abused.
Every year, domestic violence results in almost 100,000 days of hospitalizations, 30,000 emergency room visits and 40,000 physician visits, nationwide.
Nationally, four women per day die at the hands of their husbands or boyfriends and most are killed trying to leave abusive relationships.
Rhode Island police departments agree that, on a statewide basis, at least 50% of all calls are "domestic" related, reflecting national statistics.
In 1992 more women were killed in Rhode Island, as a result of domestic violence, than in any previous year.

**Sources:**

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- Rhode Island Department of the Attorney General, Domestic Violence Unit.
- State of Colorado, Domestic Violence Coalition.
- State of Massachusetts, Identifying and Treating Battered Adult and Adolescent Women and Their Children: A Guide for Health Care Providers, Department of Public Health, 1992.
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## What Is Domestic Violence?

In Rhode Island and various other states, domestic violence is a crime, often hidden, yet punishable by law. In most cases, it involves a man's assault on a woman with whom he shares a home, now or in the past, and whether or not they are married. Domestic abuse is more than physical injury. It is, as well, emotional, sexual or economic abuse that occurs between people who are involved in an intimate relationship. Abusive behavior harms, gains or maintains power and control over another person.3 Domestic violence intervention groups frequently use the Power and Control Wheel (Figure 1) to illustrate to their clients the events befalling them, in a simple and orderly way.

Women in abusive situations are commonly referred to as "battered women." Although women are most directly affected by domestic violence, the effects on the family, and on society in general, are great.

***ABBREVIATONS USED***
***NARCEA: National Agency Resource Center on Elder Abuse***
***PAHCF: Providence Ambulatory Health Care Foundation, Inc.***
***RICADV: Rhode Island Coalition Against Domestic Violence***
***AMA: American Medical Association***

Table 2.—Rhode Island Domestic Violence Statistics for Rhode Island and Providence County January 1, 1991-December 31, 1991

- Total No. RI District Court Domestic Violence Cases (Actual Arrests) ..... 4645*
  Providence (18% of State Total) ..... 838
- Total No. Temporary Restraining Orders Petitioned for Providence ..... 2363
- Total No. of R.I.'s Crisis Hotline Calls Answered: (R.I.'s Six 24-Hour Domestic Abuse Hotlines) ..... 15,154
  Providence Hotline Calls (25% of State Total) ..... 3810**
- Total No. of R.I. Clients in Community-Based Support Groups ..... 2063
  Providence Clients (23% of State Total) ..... 479**
- Total No. Clients Sheltered in R.I. ..... 939
  Providence Clients (36% of State Total) ..... 335**

A total of 192 clients (57%) are minorities (African American, Hispanic, Southeast Asian, and Native American).

* Background No. of Cases: 1989, 3375; 1990 4384 (30% increase); and 1991, 4645 (6% increase).

** Women's Center of Rhode Island, Inc. is the only domestic violence shelter operating within the city limits of Providence. However, Providence residents sometimes seek shelter and services in other locations, as well, to avoid contact with their abusers.

Source: Courtesy of Rhode Island Coalition Against Domestic Violence, in conjunction with data reported from local police departments.

Abuse may increase during pregnancy, and reports document the rate to be as high as 37% of obstetric patients, across economic, ethnic and educational lines.[4] Domestic violence is also recognized in the literature as a risk factor associated with late entry into prenatal care and miscarriages.

The elderly are often abused. The National Agency Resource Center on Elder Abuse (NACRE) estimates that, nationally, 1 in 20 elders is a victim of abuse and only 1 in 14 cases of elder abuse is ever reported. Additionally, 85% to 90% of abused elders are women, according to the Domestic Violence Unit of the RI Attorney General.

Research also indicates that experiences of family violence in childhood are correlated with higher rates of juvenile delinquency, violence, and substance abuse.[5] Protecting mothers is a way of protecting children and families; thus, domestic violence is a problem not to be ignored.

**Case 1**: A 25-year-old non-English speaking woman arrived in Providence from Guatemala as an undocumented alien. Her child and family remained in Guatemala, and she lived with the man responsible for bringing her to the US. Uninsured and pregnant, the patient came to PAHCF for prenatal care. She said her pregnancy was planned, but she miscarried after her initial visit.

During the next 2 years, the patient did not keep scheduled appointments with various health center providers. She made an appointment for an ear infection in the adult medicine clinic. The physician treated her and performed a complete physical exam revealing multiple bruises on her breast, shoulder and chest. A bilingual health aide assisted the physician, asking the patient whether she had been "hurt" at home. She stated her boyfriend drank excessively, often beat her and abused her emotionally and sexually. She described a past episode when her boyfriend kicked her in the head, at which time the police had been called. The police brought her to an emergency room where she was treated for head injuries, given a tetanus shot, Tylenol for pain and Valium. A Spanish interpreter was not available to assist the patient at the hospital, so the cause of her injuries could not be fully elicited.

On her visit to the health center, the PAHCF physician documented her bodily injuries and made an immediate referral to the staff social worker. Contact was made with an area shelter to assure the patient's safety. She was able to obtain a temporary restraining order from her abuser, and received shelter services until other arrangements could be made. The woman returned to the health center 2 months later, to thank the staff and to state she had not seen her abuser and was no longer afraid.

**Case 2**: A 30-year-old married white female used health center services for herself and her family. She had a history of financial and psychological abuse by her husband but was afraid to leave him. Staff at PAHCF had given her a wallet-sized domestic violence referral card, listing free services available statewide to victims of abuse. The patient used the card and called the Rhode Island Coalition Against Domestic Violence (RICADV) to find out how she could get herself arrested. To protect herself and her children from her husband's abuse, she had obtained a gun and planned to use it to kill her husband. The coalition provided the patient with legal and supportive services. Once the coalition helped her realize that custody of her children would be jeopardized if she resorted to violence, the patient agreed to other measures. She arranged to get a restraining order to protect her from her husband. The weapon was given temporarily to her mother, and shelter services, along with free support groups, were provided to the woman and her children.

**Case 3**: A 20-year-old single Hispanic female and her newborn were seen at the PAHCF Pediatric Clinic, accompanied by the baby's father. In the newborn's record, a family history of violent relationships was noted. The pediatrician questioned the patient about an obvious black eye and whether she was safe at home. She stated she was afraid of her boyfriend who began threatening her with a weapon. She pointed to the baby's diaper bag, while the boyfriend was distracted by staff, and a large kitchen knife, "for self-defense" was found at the bottom of the bag. The clinic social worker was called to the area and convinced the woman to call the police. Police escorted her and her infant to a shelter for protection and support services. The boyfriend was arrested for criminal violence.

These cases illustrate the importance of medical team intervention in the area of domestic violence. The

PHYSICAL
VIOLENCE
SEXUAL
USING COERCION AND THREATS
Making and/or carrying out threats to do something to hurt her • threatening to leave her, to commit suicide, to report her to welfare • making her drop charges • making her do illegal things.
USING INTIMIDATION
Making her afraid by using looks, actions, gestures • smashing things • destroying her property • abusing pets • displaying weapons.
USING ECONOMIC ABUSE
Preventing her from getting or keeping a job • making her ask for money • giving her an allowance • taking her money • not letting her know about or have access to family income
USING EMOTIONAL ABUSE
Putting her down • making her feel bad about herself • calling her names • making her think she's crazy • playing mind games • humiliating her • making her feel guilty
POWER AND CONTROL
USING MALE PRIVILEGE
Treating her like a servant • making all the big decisions • acting like the "master of the castle" • being the one to define men's and women's roles
USING ISOLATION
Controlling what she does, who she sees and talks to, what she reads, where she goes • limiting her outside involvement • using jealousy to justify actions.
USING CHILDREN
Making her feel guilty about the children • using the children to relay messages • using visitation to harass her • threatening to take the children away
MINIMIZING, DENYING AND BLAMING
Making light of the abuse and not taking her concerns about it seriously • saying the abuse didn't happen • shifting responsibility for abusive behavior • saying she caused it.
PHYSICAL
VIOLENCE
SEXUAL

Fig. 1—Power and control wheel. Reprinted with permission of the Domestic Abuse Intervention Project, 206 W. Fourth St., Duluth, MN 55806.

PAHCF model of care involves bilingual and bicultural staff working collaboratively to identify domestic violence and to provide referrals to on site social workers and external agencies. Abusive situations are not always as evident as they were in the above case studies. Because much of the problem is undetected, identification and intervention are priorities at PAHCF.

## Identification and Intervention at PAHCF

Community Health Centers are the major source of primary care services for many inner-city women at risk for domestic violence. Patients often are seen repeatedly by a number of health center staff before abuse-related injuries are identified.

One study by Stark and Flitcraft found that 1 in 5 battered women presenting to physicians had sought medical attention for injuries from abuse 11 times previously.[6] The medical community, as well as the criminal justice system, is most likely to see women victims.[7] Particularly at PAHCF, undocumented aliens, single parents and isolated families seek care in a nonthreatening and sensitive environment. For many women, PAHCF may be their only contact with a primary care provider and an interpreter, without the presence of their abuser. Therefore, PAHCF has an important role in the identification and intervention of women at risk for domestic abuse.

Routine screening for abuse is well documented in the scientific literature and recommended by the American Medical Association (AMA), regardless of whether a patient presents with signs of abuse.2 The PAHCF adult medical history form and prenatal risk assessment form address the question of domestic violence and are required for all patients. Treatment guidelines and clinical protocols on domestic violence were produced by the AMA in June 1992 and address a range of barriers and misconceptions, key to understanding the depth of this problem. These guidelines also describe indicators of abuse and how to assess the impact of abuse and violence on a patient's life. They provide examples of questions to ask patients regarding this problem.

At PAHCF, all staff members are involved in asking routine questions to detect domestic violence. It often helps to acknowledge that abuse is common in women's lives, and is thus routinely discussed with all patients. Moving from a broad to a specific focus is generally recommended. Language barriers, low literacy and culturally diverse populations make this task difficult and challenging. Along with the Power and Control Wheel,

Table 3.—The Providence Ambulatory Health Care Foundation, Inc., Female Caseload - 1991

| | |
|---|---|
| Total No. Patient Users (Unduplicated) | 23,432 |
| Total No. Female Patients | 13,600 (58%) |
| Total No. Female Patients | |
| Between 15 and 44 years of age | 7484 (32%) |
| Age 45 and over | 1479 (6%) |
| New Prenatals | 1214 |
| Total All Prenatals | 1744 |
| Includes patients initially presenting for care in 1990 | |
| **Background** | |
| Hispanic | 51% |
| Southeast Asian | 15% |
| Non-US Born | 72% |
| First Trimester Enrollees | 51% |
| Second Trimester Enrollees | 42% |
| Third Trimester Enrollees | 7% |

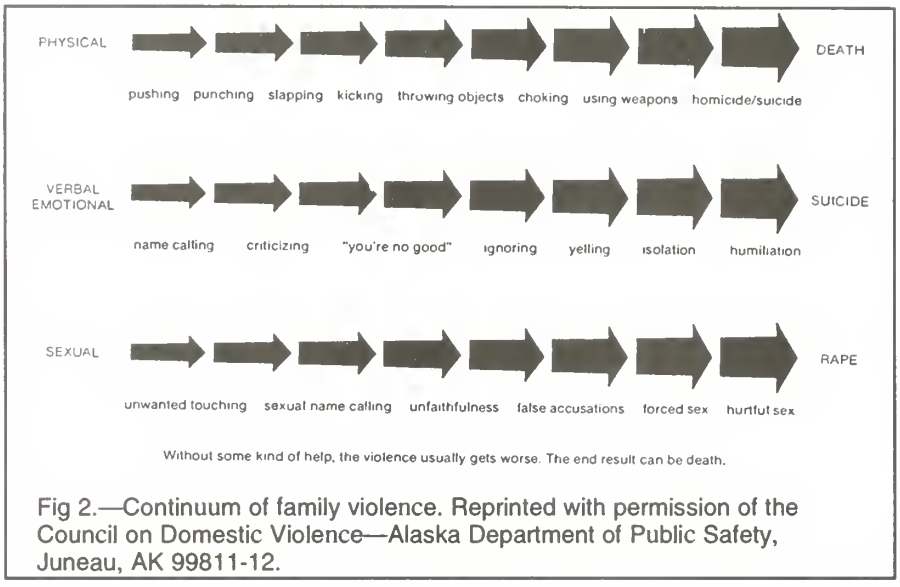
PHYSICAL
DEATH
pushing punching slapping kicking throwing objects choking using weapons homicide/suicide
VERBAL EMOTIONAL
SUICIDE
name calling criticizing "you're no good" ignoring yelling isolation humiliation
SEXUAL
RAPE
unwanted touching sexual name calling unfaithfulness false accusations forced sex hurtful sex
Without some kind of help, the violence usually gets worse. The end result can be death.

Fig 2.—Continuum of family violence. Reprinted with permission of the Council on Domestic Violence—Alaska Department of Public Safety, Juneau, AK 99811-12.

the Continuum of Family Violence (Figure 2) is used by groups working more closely with these patients. Both models are translated into other languages and are easy for patients to understand and for staff to use.

Training in the area of domestic violence was conducted for the staff at PAHCF in 1991. Excellent training manuals and videos were provided, and ongoing in-service programs are offered.

## Patient Education

Educational materials about domestic violence are distributed to patients in different languages. The poster distributed by the AMA, "When Someone You Love Strikes Out, Physically, Verbally or Emotionally, — Talk to Someone You Trust" has been displayed in patient areas.

A pocket-type referral card, produced by the RICADV, is used by staff to help patients access local services including emergency shelters, support groups, referrals, and a 24-hour hotline. The card is available in Spanish, is easily concealed from an abuser, and is conveniently dispensed in patient rest rooms.

PAHCF has established a collaborative relationship with local and state advocacy groups, shelters, legal, and child protective services. On-site arrangements are made at PAHCF for free and confidential services.

## Record-keeping & Reporting

Documentation in the patient's medical record of bodily injuries is beneficial, especially if the record is eventually used in court. A sketch of the body or an injury map, identifying injury sites with an "X," is most helpful to capture this data.8 The use of photographers at PAHCF is also encouraged.

Medical reporting for domestic violence is not mandatory in Rhode Island. According to the 1988 Domestic Violence Prevention Act (Section 12-29-9), the domestic violence training and monitoring unit of the court system shall prescribe a form for making data collection reports.

## Conclusion

Domestic violence is a serious issue facing inner-city women, many who seek health care at PAHCF. It is a problem not to be ignored because it will not go away. The time has come for all health care professionals to become more knowledgeable about violence and its prevention. Most importantly, the patient's immediate safety must be assessed and assured. In Rhode Island, many excellent community resources, advocacy groups and organizations work in family violence. PAHCF has recognized the importance of collaboration with such groups to prevent further violence and to improve the health care of inner-city women and their families.

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May 1993
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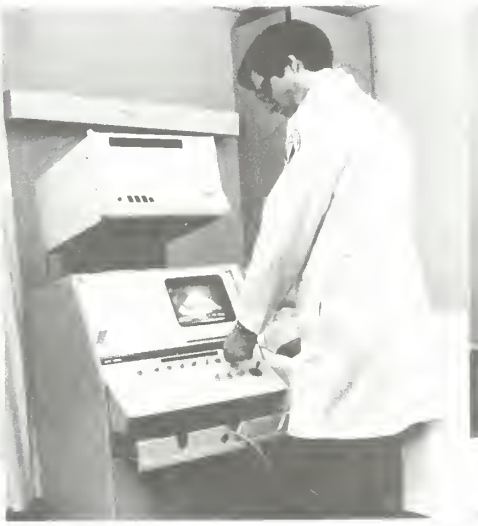

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# HEALTH BY NUMBERS

Rhode Island
Department of Health
Barbara A. DeBuono, MD, MPH
Director of Health

# Health Risk Behaviors of Urban Black and Hispanic Residents in Rhode Island

Almost every available health indicator shows that black and Hispanic Rhode Islanders have poorer health outcomes than do white, non-Hispanic residents. The poorer health outcomes of these groups in Rhode Island can be attributed to sociocultural and financial barriers to adequate health care, to environmental factors, and to individual health risk behaviors.

This report presents data on selected health risk behaviors of a sample of black and Hispanic adults residing in 11 urban census tracts in Providence and Central Falls. These census tracts were targeted because they have the highest proportion of black and Hispanic residents in the state.

Between June 1991 and February 1992 838 black and Hispanic adults age 18 and older living in households with telephones in the selected census tracts were surveyed by telephone. The survey, modeled on the Centers for Disease Control Behavioral Risk Factor Surveillance System,[1] included questions about health-risk behaviors such as cigarette smoking, alcohol consumption, levels of physical activity, and safety belt use, as well as about sociodemographic characteristics of respondents. Survey results were weighted to account for the number of telephones and adults in each sampled household and for the gender, age, and race distribution of adults within the target census tracts.

When survey results for seven health risk behaviors for urban blacks and Hispanics are compared with results for the general Rhode Island population (obtained through the 1991 Behavioral Risk Factor Surveillance System), it becomes apparent that each group has a distinctive prevalence pattern for these health-risk behaviors (Figure 1).

Risk factor prevalence rates for black and Hispanic groups are not always higher than those for the general Rhode Island population and they often differ between the two groups. Compared to the general Rhode Island population, Hispanics have a lower prevalence of current smoking and chronic alcohol consumption; blacks have lower rates for binge and chronic

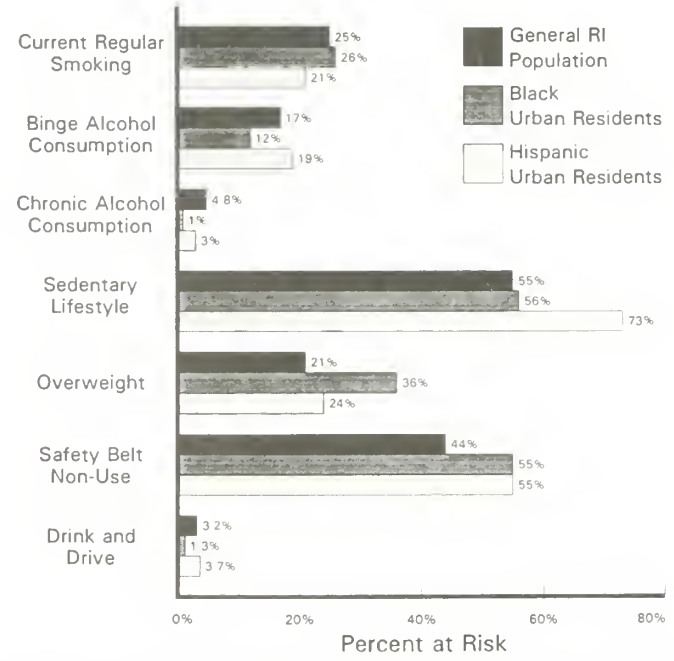


Fig 1.——Percent reporting selected health risk behaviors, for the Rhode Island general population, urban black residents, and urban Hispanic residents.

*Submitted by the Office of Health Statistics, Jana E. Hesser, PhD, Health Policy Analyst, and Jay S. Buechner, PhD, Chief.* Health by Numbers *is edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD.*

alcohol consumption and for drinking and driving. However, both groups have higher rates than the general population for sedentary lifestyle, overweight, and safety belt non-use.

When urban blacks and Hispanics are compared with one another, blacks have higher rates of smoking and of overweight, while Hispanics have higher levels of alcohol consumption (both chronic and binge), of drinking and driving, and of sedentary lifestyle. Levels of safety belt non-use are the same in the two groups.

The differing prevalence of health risk behaviors in these black and Hispanic urban populations and in the general Rhode Island population supports the need to establish different priorities for health promotion programs targeted at these groups. Priority-setting based on survey results like those presented here can help maximize the health impact of limited intervention resources.

**Figure Definitions**

**Sedentary Lifestyle** — Respondents who report no physical activity or physical activity performed for 20 minutes or less, or fewer than three times per week.

**Overweight** — Respondents with Body Mass Index (BMI, calculated as weight measured in kilograms divided by the square of height measured in meters) that equals or surpasses the age-sex specific cutoffs used with the Year 2000 National Health Objectives.

**Safety Belt Non-Use** — Respondents reporting they "sometimes", "seldom", or "never" use safety belts.

**Chronic Alcohol Consumption** — Respondents who report an average of 60 or more alcoholic drinks in the past month.

**Binge Alcohol Consumption** — Respondents who report having 5 or more drinks on an occasion, one or more times during the past month.

**Drink and Drive** — Respondents who report having driven after having had too much to drink, one or more times in the past month.

**Current Regular Smoking** — Respondents who report having smoked at least 100 cigarettes in their lifetime and who smoke regularly now.

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VOLUME I
NUMBER I

PROVIDENCE, R. I., JANUARY, 1917

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# THE RHODE ISLAND MEDICAL JOURNAL HERITAGE

## 90 Years Ago (April, 1903)

W. Louis Chapman, MD, discusses the control of hemorrhage by gelatin followed by a review and summary of the experience of others; he then offers a brief synopsis of three new, personally observed cases. The author first comments upon current means of controlling unwanted bleeding. He states: "Although the surgical means of controlling hemorrhage are fairly complete and perfect, one still seeks methods for dealing with bleeding from comparatively inaccessible organs such as the stomach, lungs and kidneys, and for the hemorrhagic diathesis. Adrenal extract, and its active principle epinephrine is certainly a very useful hemostatic, acting as it does by constricting the capillaries . . ." The author then cites parenteral and oral uses of gelatin (typically in 1% solutions) in hemoptysis, hematuria, uterine bleeding, and diffuse bleeding from the colon and urinary bladder. He speculates that the hemostatic effect may be caused by the calcium chloride added to the gelatin. He concludes that gelatin has a distinct place in therapeutics; that its efficiency is due to its power to increase coagulability and thus is particularly valuable in hemophilia and cholemia; that it may be given by the stomach route as well as by injection; and that its results often surpass the more doubtful hemostatics such as ergot, opium, the salts of iron and perhaps adrenaline.

Jay Perkins, MD, discusses some new methods for the treatment of pulmonary tuberculosis. The first new remedy he cites is cinnamic acid and its derivatives (potassium cinnamate), an active ingredient of balsam of Peru. The drug is administered, dissolved in distilled water, by vein or injected into muscle. "It is claimed that in moderately early cases the Rales and the bacilli in the sputum disappear in from 3 to 6 months. "Cinnamate causes an increase in circulating leucocytes and this, it is speculated, may be its mode of action against the acid-fast bacillus. A second drug used as a new antituberculosis therapy, cacodylic acid, is chemically related to arsenic acid and physicians are cautioned to respect its toxicity. Yet another drug employed "to kill the bacilli in the lungs" is formaldehyde injected intravenously (0.2% solution) but, to the dismay of its advocates, it seems to produce albuminuria and hematuria. The possible healing effects of the actinic rays of sunlight are discussed at length. The mode of action appears to be an engorgement of blood to the chest thus "bringing increased nutrition to the parts and gradually repair is effected. The light also has an inhibiting effect on the bacilli." None of these newer treatments should be entertained, says the author, to the exclusion of the open air treatment which, he states, is rounded on rational principles. Open air "increases the appetite and lessens the languor and exhaustion of a chronic febrile disease which the still, warm air of the sick room tends to increase." Finally, the author discusses the vital importance of a balanced diet particularly high in proteids taken in the form of milk.

Douglas P.A. Jacoby, MD, describes the morbid events leading to the first conviction in the state of Rhode Island for criminal abortion. The convicted person, a Mrs. Cecilia Smith of Newport, had apparently performed a criminal abortion in March 1899. Because of subsequent hemorrhaging, the victim was attended by a physician. The police authorities were called and an ante-mortem statement implicating Mrs. Smith was made by the patient. A short while later, the patient died and a post-mortem examination uncovered a large pyloric ulcer from whence came the hemorrhage, evidence of gastric perforation and a subphrenic abscess. The cause of death was therefore determined not to be the abortion, and Mrs. Smith's case was dismissed by the court. In the words of the author, "This experience made no impression upon Mrs. Smith and she continued with unabated enthusiasm" with her clandestine activities until she was arrested again because of an abortion performed on a Miss M.W. The patient was hospitalized, found to have retained, necrotic placental tissues; and despite curettage, "the patient was not expected to live." After a second trial, Mrs. Smith was convicted for criminal abortion and was sentenced to 2 years of hard labor in the state's prison.

William J. Burge, MD, discusses cremation. "The best mode of dispos-

ing of our dead is a question concerning sanitation, religion and economy. We know that earth burial as now conducted is a menace to public health. We know that incineration as now conducted is clean, sanitary, expeditious and economical. In its religous aspect, cremation is endorsed by ecclesiastics of every denomination as a reverential, pure and undefiled method of treatment for corruptible human bodies which have been finally vacated by their immortal souls. On the score of economy it has a marked advantage, while not interfering in the slightest degree with lavish expenditure for funeral pomp and display, on the part of those who can afford it, or whose tastes so lead them." The author solemnly concludes: "I do not know whether any medical society in its corporate capacity has advocated cremation. If not, it would be gratifying to me should the Providence Medical Association see fit to take the initiative in the matter."

A few sparse advertisements fill the last page of this issue. One is for a leather carrying case with interior trays for 36 vials (1 ounce to 3 1/2 drachm sizes) and room for medical instruments. The case, called a Hand and Buggy Case, is made of basswood covered with cowhide and costs $6. A second advertisement discusses the great advantages of Scheidel coils to produce the most powerful X-rays.

### 50 Years Ago (April 1943)

The lead article, written by Wilfred Pickles, MD, discusses bleeding in the head following physical injury, and the gravity of such trauma. The author states that there are instances when surgical intervention may be of material help particularly when the middle meningeal artery is damaged (with extradural bleeding), when bridging veins are lacerated (with subdural bleeding) or when the bleeding is localized. He illustrates his contention that the locallization of the hematoma may be atypical and its precise location difficult to determine by describing three unusual cases of head injury. The first was a 51-year-old laborer, a heavy drinker for many years, who had fallen down a flight of stairs. The following morning he could not move his right arm or leg, complained of headache and vomited. A subdural hemorrhage was suspected and a craniotomy verified its existence, but a subpial hematoma was also found. He died on the 7th post operative day. A post mortem examination disclosed multiple skull fractures and multiple cerebral injuries, including a large collection of subpial blood. A second patient, a 35-year-old worker, was struck by a street-car and brought unconscious to the hospital. When the patient stabilized, a craniotomy revealed a large subpial hematoma. A third patient was a 55-year-old millworker who slipped while climbing a ladder, striking his head upon a concrete floor. A craniotomy was inconclusive and a post-mortem examination disclosed a large parietal lobe hemorrhage that had ruptured into the lateral ventricle.

The proceedings of a clinical pathological conference, conducted by Drs. Burgess and Clarke are summarized. The patient was a 61-year-old male with weakness, tarry stools, abdominal pain and marked anemia. An autopsy disclosed the existence of a bleeding pyloric ulcer and a massive myocardial infarction.

The lead editorial comments on the deplorable habit, within medicine, to rediscover techniques or therapies and promptly attaching one's own name to


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AA/EOE

them. The writer concludes: "If we know how our predecessors have struggled over these problems we will find their balanced judgments have often gone far to settle our latter-day problems."

Another editorial ponders on the new, and paradoxical, findings that cold may have a salutary effect on persons suffering from shock. "It is continually being impressed upon us that Nature works in a mysterious way her wonders to perform. And many of man's altruistic attempts to regulate Nature have been shown to be useless if not harmful. Antipyretics were much used in the past. Now fever is generally conceived of as a purposeful device. Perhaps cold and prostration may often be in the same category. We will undoubtedly see attempts to produce testimony."

Books reviews in this issue of the Journal include Trueta's Principles and Practice of War Surgery, and a new and controversial textbook, Weiss and English's Psychosomatic Medicine.

### 25 Years Ago (April 1968)

Drs. Louis Leone, Harold Musicker, Maurice Albala and William McGurk provide the lead article on the effectiveness of a smoking deterrence clinic at Rhode Island Hospital. The research component of the project is stated to be: (1) Observe the behavior of voluntary candidates during the process of smoking withdrawal; and (2) determine a useful procedure for assisting voluntary candidates to discontinue smoking in a clinic or group setting. The authors provide extensive demographic data on this smoking population and conclude: Voluntary participation in a group smoking deterrent effort by laboring and low educational segments of the population is less than among office and professional groups. Early acquirement of the fixed smoking habit contributes to increased difficulty in withdrawal attempts. The use of lobeline did not significantly alter cigarette withdrawal rate.

Herbert Constantine, MD, describes an automated multiphasic screening center and its effects upon the protection of adult health. He emphasizes that this center offers an assessment process and not a substitute for traditional history and physical examination; nor does it offer any therapies. The screening includes such elements as EKG, chest X-ray, mammography, and various clinical laboratory tests on blood and urine.

Charles Williamson, counsel to the Rhode Island Medical Society, discusses the physician's legal liability for refusing emergency aid.

Arnold Porter, MD, president of the Rhode Island Medical Society Physicians Service, summarizes changes in such physician service plans as the local Blue Shield during the year, 1967.

Editorials touch upon such seminal issues as the prerogative of free choice, air pollution, hospital costs, hospital accreditation and the beginnings of extracorporeal heart-lung machinery.


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**Specifications**: Manuscripts should be typewritten on one side of the paper only, with double spacing and liberal margins, using 8" x 11" non-erasable bond. Tables, charts, and legends should be submitted separately from the text and referred to by number (eg, Fig. 1 or Table 2, etc.) Number pages consecutively.

To expedite production and ensure accuracy, authors are **strongly encouraged** to submit articles as well as computer-generated tables and figures on floppy diskette, formatted in any major MS-DOS or Windows word processor (eg, Microsoft Word, Wordperfect, Wordstar, Xywrite, Multimate, etc.) Macintosh disks will be accepted provided text is saved in an ASCII file. If possible, Macintosh disks should be saved in DOS format, using Apple File Exchange. Diskettes must be accompanied with at least one printed copy of the manuscript. Diskettes will be returned upon request.

**Title page:** The first page of the manuscript should contain: (1) title of the contribution; (2) authors' name(s), highest academic degree, and institution; (3) address and phone number for communications; (4) a brief biographical description of each author, including specialty, practice location, academic appointment and hospital affiliation.

**Abbreviations**: Avoid the use of jargon and unnecessary abbreviations. Abbreviations used, especially of laboratory and diagnostic procedures, must be identified fully in the text within parentheses. The author(s) shall provide *Rhode Island Medicine* with a complete alphabetic list of such abbreviations with an explanation for each, on a separate page.

**References**: References shall be limited to those that are absolutely essential to the understanding of the article and should number no more than 20. The editor reserves the right to reduce the number when necessary. The author is responsible for the accuracy and completeness of the references. References should be compiled at the end of the article according to the order of citation in the text. In the text, they should be given as numerical superscripts. They should be typewritten, double-spaced under the heading "References." A complete journal reference includes: (1) authors' sumames and initials; (2) title of article and subtitle, if any; (3) abbreviated name of journal (abbreviations must conform to those used in the *Index Medicus*); (4) year; (5) volume number; (6) part or supplement number, when pertinent, and issue month or number when pagination is not consecutive throughout a volume; and (7) inclusive page numbers. A complete book reference includes (1) authors' surnames and initials; (2) surname and initials of editor or translator, or both, if any; (3) title of book and subtitle, if any; (4) number of editions after the first; (5) place of publication; (6) name of publisher; (7) year of publication; (8) volume number, if more than one; and (9) page numbers, if specific pages are cited. References should conform to the punctuation and style set forth in the American Medical Association's *Manual of Style,* 8th ed.:

**Journal Article:**

1. Feinfeld DA, al-Achkar G, Lipner HI, Chirayil SJ, Hakim J, Avram MM. Syndrome of inappropriate secretion of antidiuretic hormone: Association with cavernous sinus thrombosis. *JAMA.* 1978;240:856-857.

**Books:**

2. Hollingworth JW. *Local and Systemic Complications of Rheumatoid Arthritis.* Philadelphia, Pa: Saunders; 1968.

**Book Chapter**

3. Epstein WL. Erythema nodosum. In: Samter M, ed. *Immunological Diseases*, 2nd ed. Boston, Mass.: Little, Brown; 1971;2:944-951.

**Illustrations** - Drawings and charts must be submitted in black ink on white paper. Laser printed graphs are acceptable provided they are printed at 300 DPI resolution. Photographs must be in black and white, submitted on 5 x 7 glossy paper. Illustrations must be numbered consecutively and their positions indicated in the text. The figure number, indication of the top, and the name of the author must be attached to the back of each illustration. Legends should be submitted in a single list with the numbers corresponding to those on the illustrations. Recognizable photographs of patients are to be appropriately masked and must carry with them written permission for publication. Special arrangments must be made with the editors for excessive numbers of illustrations. Color plates are not acceptable.

**Identification of Patients** - Names and initials should not be used. When discussing individual patients use numbers (ie, Patient 1, Patient 2, etc.).

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**Correspondence** - Letters-to-the-editor and all manuscripts should be addressed to Stanley M. Aronson, MD, Editor-in-Chief, Box G, Brown University, Providence, RI 02912. All other correspondence relating to the publication should be addressed to: John P. Sulima, Managing Editor, *Rhode Island Medicine*, 8 Potter Hill Road, Westerly, RI 02891.

**Reference: 1.** Jones PH, et al. Once-daily pravastatin in patients with primary hypercholesterolemia: a dose-response study. *Clin Cardiol* 1991;14:146-151.

## PRAVACHOL® (Pravastatin Sodium Tablets)

### CONTRAINDICATIONS

Hypersensitivity to any component of this medication.

Active liver disease or unexplained, persistent elevations in liver function tests (see WARNINGS).

*Pregnancy and lactation.* Atherosclerosis is a chronic process and discontinuation of lipid-lowering drugs during pregnancy should have little impact on the outcome of long-term therapy of primary hypercholesterolemia. Cholesterol and other products of cholesterol biosynthesis are essential components for fetal development (including synthesis of steroids and cell membranes). Since HMG-CoA reductase inhibitors decrease cholesterol synthesis and possibly the synthesis of other biologically active substances derived from cholesterol, they may cause fetal harm when administered to pregnant women. Therefore, HMG-CoA reductase inhibitors are contraindicated during pregnancy and in nursing mothers. **Pravastatin should be administered to women of childbearing age only when such patients are highly unlikely to conceive and have been informed of the potential hazards.** If the patient becomes pregnant while taking this class of drug, therapy should be discontinued and the patient apprised of the potential hazard to the fetus.

### WARNINGS

**Liver Enzymes:** HMG-CoA reductase inhibitors, like some other lipid-lowering therapies, have been associated with biochemical abnormalities of liver function. Increases of serum transaminase (ALT, AST) values to more than 3 times the upper limit of normal occurring on 2 or more (not necessarily sequential) occasions have been reported in 1.3% of patients treated with pravastatin in the U.S. over an average period of 18 months. These abnormalities were not associated with cholestasis and did not appear to be related to treatment duration. In those patients in whom these abnormalities were believed to be related to pravastatin and who were discontinued from therapy, the transaminase levels usually fell slowly to pretreatment levels. These biochemical findings are usually asymptomatic although worldwide experience indicates that anorexia, weakness, and/or abdominal pain may also be present in rare patients.

As with other lipid-lowering agents, liver function tests should be performed during therapy with pravastatin. Serum aminotransferases, including ALT (SGPT), should be monitored before treatment begins, every six weeks for the first three months, every eight weeks during the remainder of the first year, and periodically thereafter (e.g., at about six-month intervals). Special attention should be given to patients who develop increased transaminase levels. Liver function tests should be repeated to confirm an elevation and subsequently monitored at more frequent intervals. If increases in AST and ALT equal or exceed three times the upper limit of normal and persist, then therapy should be discontinued. Persistence of significant aminotransferase elevations following discontinuation of therapy may warrant consideration of liver biopsy.

Active liver disease or unexplained transaminase elevations are contraindications to the use of pravastatin (see CONTRAINDICATIONS). Caution should be exercised when pravastatin is administered to patients with a history of liver disease or heavy alcohol ingestion (see CLINICAL PHARMACOLOGY: Pharmacokinetics/Metabolism). Such patients should be closely monitored, started at the lower end of the recommended dosing range, and titrated to the desired therapeutic effect.

**Skeletal Muscle: Rhabdomyolysis with renal dysfunction secondary to myoglobinuria has been reported with pravastatin and other drugs in this class.** Uncomplicated myalgia has also been reported in pravastatin-treated patients (see ADVERSE REACTIONS). Myopathy, defined as muscle aching or muscle weakness in conjunction with increases in creatine phosphokinase (CPK) values to greater than 10 times the upper limit of normal was reported to be possibly due to pravastatin in only one patient in clinical trials (<0.1%). Myopathy should be considered in any patient with diffuse myalgias, muscle tenderness or weakness, and/or marked elevation of CPK. Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever. **Pravastatin therapy should be discontinued if markedly elevated CPK levels occur or myopathy is diagnosed or suspected. Pravastatin therapy should also be temporarily withheld in any patient experiencing an acute or serious condition predisposing to the development of renal failure secondary to rhabdomyolysis, e.g., sepsis; hypotension; major surgery; trauma; severe metabolic, endocrine, or electrolyte disorders; or uncontrolled epilepsy.**

The risk of myopathy during treatment with lovastatin is increased if therapy with either cyclosporine, gemfibrozil, erythromycin, or niacin is administered concurrently. There is no experience with the use of pravastatin together with cyclosporine. Myopathy has not been observed in clinical trials involving small numbers of patients who were treated with pravastatin together with niacin. One trial of limited size involving combined therapy with pravastatin and gemfibrozil showed a trend toward more frequent CPK elevations and patient withdrawals due to musculoskeletal symptoms in the group receiving combined treatment as compared with the groups receiving placebo, gemfibrozil, or pravastatin monotherapy. Myopathy was not reported in this trial (see PRECAUTIONS: Drug Interactions). One patient developed myopathy when clofibrate was added to a previously well tolerated regimen of pravastatin, the myopathy resolved when clofibrate therapy was stopped and pravastatin treatment continued. **The use of fibrates alone may occasionally be associated with myopathy. The combined use of pravastatin and fibrates should generally be avoided.**

### PRECAUTIONS

**General:** Pravastatin may elevate creatine phosphokinase and transaminase levels (see ADVERSE REACTIONS). This should be considered in the differential diagnosis of chest pain in a patient on therapy with pravastatin.

*Homozygous Familial Hypercholesterolemia.* Pravastatin has not been evaluated in patients with rare homozygous familial hypercholesterolemia. In this group of patients, it has been reported that HMG-CoA reductase inhibitors are less effective because the patients lack functional LDL receptors.

*Renal Insufficiency.* A single 20 mg oral dose of pravastatin was administered to 24 patients with varying degrees of renal impairment (as determined by creatinine clearance). No effect was observed on the pharmacokinetics of pravastatin or its 3α-hydroxy isomeric metabolite (SQ 31,906). A small increase was seen in mean AUC values and half-life (t1/2) for the inactive enzymatic ring hydroxylation metabolite (SQ 31,945). Given this small sample size, the dosage administered, and the degree of individual variability, patients with renal impairment who are receiving pravastatin should be closely monitored.

**Information for Patients:** Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever.

**Drug Interactions:** *Immunosuppressive Drugs, Gemfibrozil, Niacin (Nicotinic Acid), Erythromycin.* See WARNINGS: Skeletal Muscle.

*Antipyrine.* Clearance by the cytochrome P450 system was unaltered by concomitant administration of pravastatin. Since pravastatin does not appear to induce hepatic drug-metabolizing enzymes, it is not expected that any significant interaction of pravastatin with other drugs (e.g., phenytoin, quinidine) metabolized by the cytochrome P450 system will occur.

*Cholestyramine/Colestipol.* Concomitant administration resulted in an approximately 40 to 50% decrease in the mean AUC of pravastatin. However, when pravastatin was administered 1 hour before or 4 hours after cholestyramine or 1 hour before colestipol and a standard meal, there was no clinically significant decrease in bioavailability or therapeutic effect. (See DOSAGE AND ADMINISTRATION: Concomitant Therapy.)

*Warfarin.* In a study involving 10 healthy male subjects given pravastatin and warfarin concomitantly for 6 days, bioavailability parameters at steady state for pravastatin (parent compound) were not altered. Pravastatin did not alter the plasma protein-binding of warfarin. Concomitant dosing did increase the AUC and Cmax of warfarin but did not produce any changes in its anticoagulant action (i.e., no increase was seen in mean prothrombin time after 6 days of concomitant therapy). However, bleeding and extreme prolongation of prothrombin time has been reported with another drug in this class. Patients receiving warfarin-type anticoagulants should have their prothrombin times closely monitored when pravastatin is initiated or the dosage of pravastatin is changed.

*Cimetidine.* The $AUC_{0\text{-}12hr}$ for pravastatin when given with cimetidine was not significantly different from the AUC for pravastatin when given alone. A significant difference was observed between the AUC's for pravastatin when given with cimetidine compared to when administered with antacid.

*Digoxin.* In a crossover trial involving 18 healthy male subjects given pravastatin and digoxin concurrently for 9 days, the bioavailability parameters of digoxin were not affected. The AUC of pravastatin tended to increase, but the overall bioavailability of pravastatin plus its metabolites SQ 31,906 and SO 31,945 was not altered.

*Gemfibrozil.* In a crossover study in 20 healthy male volunteers given concomitant single doses of pravastatin and gemfibrozil, there was a significant decrease in urinary excretion and protein binding of pravastatin. In addition, there was a significant increase in AUC, Cmax, and Tmax for the pravastatin metabolite SO 31,906. Combination therapy with pravastatin and gemfibrozil is generally not recommended.

In interaction studies with *aspirin, antacids* [1 hour prior to PRAVACHOL (pravastatin sodium)], *cimetidine, nicotinic acid, or probucol,* no statistically significant differences in bioavailability were seen when PRAVACHOL was administered.

*Other Drugs.* During clinical trials, no noticeable drug interactions were reported when PRAVACHOL was added to: diuretics, antihypertensives, digitalis, converting-enzyme inhibitors, calcium channel blockers, beta-blockers, or nitroglycerin.

**Endocrine Function:** HMG-CoA reductase inhibitors interfere with cholesterol synthesis and lower circulating cholesterol levels and, as such, might theoretically blunt adrenal or gonadal steroid hormone production. Results of clinical trials with pravastatin in males and post-menopausal females were inconsistent with regard to possible effects of the drug on basal steroid hormone levels. In a study of 21 males, the mean testosterone response to human chorionic gonadotropin was significantly reduced ($p<0.004$) after 16 weeks of treatment with 40 mg of pravastatin. However, the percentage of patients showing a ≥50% rise in plasma testosterone after human chorionic gonadotropin stimulation did not change significantly after therapy in these patients. The effects of HMG-CoA reductase inhibitors on spermatogenesis and fertility have not been studied in adequate numbers of patients. The effects, if any, of pravastatin on the pituitary-gonadal axis in pre-menopausal females are unknown. Patients treated with pravastatin who display clinical evidence of endocrine dysfunction should be evaluated appropriately. Caution should also be exercised if an HMG-CoA reductase inhibitor or other agent used to lower cholesterol levels is administered to patients also receiving other drugs (e.g., ketoconazole, spironolactone, cimetidine) that may diminish the levels or activity of steroid hormones.

**CNS Toxicity:** CNS vascular lesions, characterized by perivascular hemorrhage and edema and mononuclear cell infiltration of perivascular spaces, were seen in dogs treated with pravastatin at a dose of 25 mg/kg/day, a dose that produced a plasma drug level about 50 times higher than the mean drug level in humans taking 40 mg/day. Similar CNS vascular lesions have been observed with several other drugs in this class.

A chemically similar drug in this class produced optic nerve degeneration (Wallerian degeneration of retinogeniculate fibers) in clinically normal dogs in a dose-dependent fashion starting at 60 mg/kg/day, a dose that produced mean plasma drug levels about 30 times higher than the mean drug level in humans taking the highest recommended dose (as measured by total enzyme inhibitory activity). This same drug also produced vestibulocochlear Wallerian-like degeneration and retinal ganglion cell chromatolysis in dogs treated for 14 weeks at 180 mg/kg/day, a dose which resulted in a mean plasma drug level similar to that seen with the 60 mg/kg dose.

**Carcinogenesis, Mutagenesis, Impairment of Fertility:** In a 2-year study in rats fed pravastatin at doses of 10, 30, or 100 mg/kg body weight, there was an increased incidence of hepatocellular carcinomas in males at the highest dose ($p<0.01$). Although rats were given up to 125 times the human dose (HD) on a mg/kg body weight basis, their serum drug levels were only 6 to 10 times higher than those measured in humans given 40 mg pravastatin as measured by AUC.

The oral administration of 10, 30, or 100 mg/kg (producing plasma drug levels approximately 0.5 to 5.0 times human drug levels at 40 mg) of pravastatin to mice for 22 months resulted in a statistically significant increase in the incidence of malignant lymphomas in treated females when all treatment groups were pooled and compared to controls ($p<0.05$). The incidence was not dose-related and male mice were not affected.

A chemically similar drug in this class was administered to mice for 72 weeks at 25, 100, and 400 mg/kg body weight, which resulted in mean serum drug levels approximately 3, 15, and 33 times higher than the mean human serum drug concentration (as total inhibitory activity) after a 40 mg oral dose. Liver carcinomas were significantly increased in high-dose females and mid- and high-dose males, with a maximum incidence of 90 percent in males. The incidence of adenomas of the liver was significantly increased in mid- and high-dose females. Drug treatment also significantly increased the incidence of lung adenomas in mid- and high-dose males and females. Adenomas of the eye Harderian gland (a gland of the eye of rodents) were significantly higher in high-dose mice than in controls.

No evidence of mutagenicity was observed *in vitro*, with or without rat-liver metabolic activation, in the following studies: microbial mutagen tests, using mutant strains of *Salmonella typhimurium* or *Escherichia coli*; a forward mutation assay in L5178Y TK +/− mouse lymphoma cells; a chromosomal aberration test in hamster cells; and a gene conversion assay using *Saccharomyces cerevisiae*. In addition, there was no evidence of mutagenicity in either a dominant lethal test in mice or a micronucleus test in mice.

In a study in rats, with daily doses up to 500 mg/kg, pravastatin did not produce any adverse effects on fertility or general reproductive performance. However, in a study with another HMG-CoA reductase inhibitor, there was decreased fertility in male rats treated for 34 weeks at 25 mg/kg body weight, although this effect was not observed in a subsequent fertility study when this same dose was administered for 11 weeks (the entire cycle of spermatogenesis, including epididymal maturation). In rats treated with this same reductase inhibitor at 180 mg/kg/day, seminiferous tubule degeneration (necrosis and loss of spermatogenic epithelium) was observed. Although not seen with pravastatin, two similar drugs in this class caused drug-related testicular atrophy, decreased spermatogenesis, spermatocytic degeneration, and giant cell formation in dogs. The clinical significance of these findings is unclear.

**Pregnancy; Pregnancy Category X:** See CONTRAINDICATIONS.

Safety in pregnant women has not been established. Pravastatin was not teratogenic in rats at doses up to 1000 mg/kg daily or in rabbits at doses of up to 50 mg/kg daily. These doses resulted in 20× (rabbit) or 240× (rat) the human exposure based on surface area ($mg/meter^2$). However, in studies with another HMG-CoA reductase inhibitor, skeletal malformations were observed in rats and mice. PRAVACHOL (pravastatin sodium) should be administered to women of child-bearing potential only when such patients are highly unlikely to conceive and have been informed of the potential hazards. If the woman becomes pregnant while taking PRAVACHOL, it should be discontinued and the patient advised again as to the potential hazards to the fetus.

**Nursing Mothers:** A small amount of pravastatin is excreted in human breast milk. Because of the potential for serious adverse reactions in nursing infants, women taking PRAVACHOL should not nurse (see CONTRAINDICATIONS).

**Pediatric Use:** Safety and effectiveness in individuals less than 18 years old have not been established. Hence, treatment in patients less than 18 years old is not recommended at this time. (See also PRECAUTIONS: **General**.)

### ADVERSE REACTIONS

Pravastatin is generally well tolerated, adverse reactions have usually been mild and transient. In 4-month long placebo-controlled trials, 1.7% of pravastatin-treated patients and 1.2% of placebo-treated patients were discontinued from treatment because of adverse experiences attributed to study drug therapy; this difference was not statistically significant. In long-term studies, the most common reasons for discontinuation were asymptomatic serum transaminase increases and mild, non-specific gastrointestinal complaints. During clinical trials the overall incidence of adverse events in the elderly was not different from the incidence observed in younger patients.

**Adverse Clinical Events:** All adverse clinical events (regardless of attribution) reported in more than 2% of pravastatin-treated patients in the placebo-controlled trials are identified in the table below, also shown are the percentages of patients in whom these medical events were believed to be related or possibly related to the drug.

| | All Events % | | Events Attributed to Study Drug % | |
|---|---|---|---|---|
| Body System/Event | Pravastatin (N = 900) | Placebo (N = 411) | Pravastatin (N = 900) | Placebo (N = 411) |
| Cardiovascular | | | | |
| Cardiac Chest Pain | 4.0 | 3.4 | 0.1 | 0.0 |
| Dermatologic | | | | |
| Rash | 4.0* | 1.1 | 1.3 | 0.9 |
| Gastrointestinal | | | | |
| Nausea/Vomiting | 7.3 | 7.1 | 2.9 | 3.4 |
| Diarrhea | 6.2 | 5.6 | 2.0 | 1.9 |
| Abdominal Pain | 5.4 | 6.9 | 2.0 | 3.9 |
| Constipation | 4.0 | 7.1 | 2.4 | 5.1 |
| Flatulence | 3.3 | 3.6 | 2.7 | 3.4 |
| Heartburn | 2.9 | 1.9 | 2.0 | 0.7 |
| General | | | | |
| Fatigue | 3.8 | 3.4 | 1.9 | 1.0 |
| Chest Pain | 3.7 | 1.9 | 0.3 | 0.2 |
| Influenza | 2.4* | 0.7 | 0.0 | 0.0 |
| Musculoskeletal | | | | |
| Localized Pain | 10.0 | 9.0 | 1.4 | 1.5 |
| Myalgia | 2.7 | 1.0 | 0.6 | 0.0 |
| Nervous System | | | | |
| Headache | 6.2 | 3.9 | 1.7* | 0.2 |
| Dizziness | 3.3 | 3.2 | 1.0 | 0.5 |
| Renal/Genitourinary | | | | |
| Urinary Abnormality | 2.4 | 2.9 | 0.7 | 1.2 |
| Respiratory | | | | |
| Common Cold | 7.0 | 6.3 | 0.0 | 0.0 |
| Rhinitis | 4.0 | 4.1 | 0.1 | 0.0 |
| Cough | 2.6 | 1.7 | 0.1 | 0.0 |

*Statistically significantly different from placebo.

The following effects have been reported with drugs in this class:

*Skeletal:* myopathy, rhabdomyolysis.

*Neurological:* dysfunction of certain cranial nerves (including alteration of taste, impairment of extra-ocular movement, facial paresis), tremor, vertigo, memory loss, paresthesia, peripheral neuropathy, peripheral nerve palsy.

*Hypersensitivity Reactions:* An apparent hypersensitivity syndrome has been reported rarely which has included one or more of the following features: anaphylaxis, angioedema, lupus erythematous-like syndrome, polymyalgia rheumatica, vasculitis, purpura, thrombocytopenia, leukopenia, hemolytic anemia, positive ANA, ESR increase, arthritis, arthralgia, urticaria, asthenia, photosensitivity, fever, chills, flushing, malaise, dyspnea, toxic epidermal necrolysis, erythema multiforme, including Stevens-Johnson syndrome.

*Gastrointestinal:* pancreatitis, hepatitis, including chronic active hepatitis, cholestatic jaundice, fatty change in liver, and, rarely, cirrhosis, fulminant hepatic necrosis, and hepatoma, anorexia, vomiting.

*Reproductive:* gynecomastia, loss of libido, erectile dysfunction.

*Eye:* progression of cataracts (lens opacities), ophthalmoplegia.

**Laboratory Test Abnormalities:** Increases in serum transaminase (ALT, AST) values and CPK have been observed (see WARNINGS).

Transient, asymptomatic eosinophilia has been reported. Eosinophil counts usually returned to normal despite continued therapy. Anemia, thrombocytopenia, and leukopenia have been reported with other HMG-CoA reductase inhibitors.

**Concomitant Therapy:** Pravastatin has been administered concurrently with cholestyramine, colestipol, nicotinic acid, probucol and gemfibrozil. Preliminary data suggest that the addition of either probucol or gemfibrozil to therapy with lovastatin or pravastatin is **not** associated with greater reduction in LDL-cholesterol than that achieved with lovastatin or pravastatin alone. No adverse reactions unique to the combination or in addition to those previously reported for each drug alone have been reported. Myopathy and rhabdomyolysis (with or without acute renal failure) have been reported when another HMG-CoA reductase inhibitor was used in combination with immunosuppressive drugs, gemfibrozil, erythromycin, or lipid-lowering doses of nicotinic acid. Concomitant therapy with HMG-CoA reductase inhibitors and these agents is generally not recommended. (See WARNINGS: **Skeletal Muscle** and PRECAUTIONS: **Drug Interactions.**)

### OVERDOSAGE

There have been no reports of overdoses with pravastatin.

Should an accidental overdose occur, treat symptomatically and institute supportive measures as required.

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D3-K005

Issued March 1993

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THE PRAVACHOL® DIRECTION IN LIPID MANAGEMENT

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## pravastatin sodium 20 mg tablets

PRAVACHOL is indicated as an adjunct to diet for the reduction of elevated total and LDL-cholesterol levels in patients with primary hypercholesterolemia (Types IIa and IIb) when the response to diet alone has not been adequate.

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*Please see CONTRAINDICATIONS, WARNINGS, PRECAUTIONS, and ADVERSE REACTIONS in the brief summary of prescribing information on the adjacent page.*

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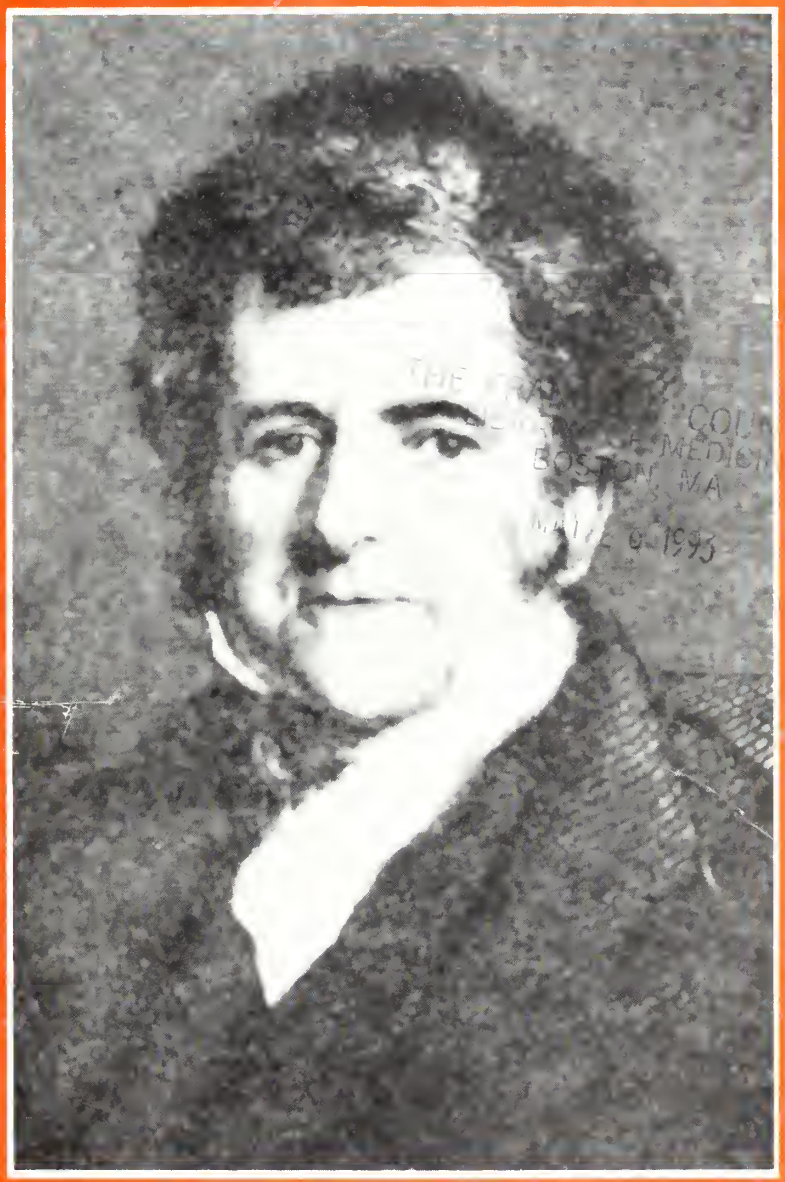
MEDICINE

Volume 76, Number 5



# Hypertension

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**Cover:** Richard Bright, MD, FRS, (1789-1858) British clinician; describer of nephritis and its relation to dropsy.


**Rhode Island Medicine** is owned and published monthly by the Rhode Island Medical Society, 106 Francis Street, Providence, Rhode Island 02903, Ph. 401-331-3207. Single copies $4.00 — Subscriptions $40.00 per year (members of the Rhode Island Medical Society — $5.00 annually). Published articles represent opinions of the authors and do not necessarily reflect the official policy of the Rhode Island Medical Society unless clearly specified. Advertisements do not imply sponsorship or endorsement by the Rhode Island Medical Society. Second class postage paid at Providence, Rhode Island. **ISSN 1061-222X.** POSTMASTER: Send address changes to RHODE ISLAND MEDICINE, 106 Francis Street, Providence, RI 02903. Advertising Representative. Narragansett Graphics, 9 Marriot Avenue, Westerly, Rhode Island 0289. Phone: (401)596-0117. FAX (401) 596-7799. National Advertising Bureau: State Medical Journal Advertising Bureau, Inc., 711 South Blvd., Oak Park, Illinois 60302. Phone 708-383-8800.

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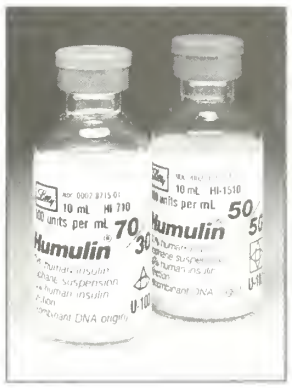


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# COMMENTARIES

## Essential Hypertension: A Perspective

Why does pressure in the systemic arteries become elevated? How does increased blood pressure damage these important vessels? How can we lower or prevent high blood pressure and eliminate its morbid complications? The search for answers to these seemingly simple problems has led to more than a century of important clinical observations and scientific contributions. Ironically, the important medical advances generated by this inquiry have occurred despite a persistent inability to define the pathophysiologic mechanisms that cause essential hypertension.

The systematic study of high blood pressure began in the early 1800s with Richard Bright, whose figure graces the cover of this month's Rhode Island Medicine. Bright is recognized for attaching a specific cause (glomerulonephritis) and effect ("dropsy," or congestive heart failure) to the clinical observation of high blood pressure ("hardness of the pulse"). It was not until 1879, almost 50 years later, that another English physician of great brilliance but less renown, Frederick Akbar Mahomed, recognized that high blood pressure often occurred in the absence of renal disease. Thus was born the concept of essential hypertension.

Investigation aimed at finding the pathophysiologic basis of essential hypertension began in earnest in the 1920s and 1930s. Irvine Page, considered by many to be the father of modern hypertension research, was instrumental in publicizing the importance of high blood pressure research and attracting leading scientists to the cause. His own research resulted in identification of the vasoactive compounds, angiotensin and serotonin. His "mosaic theory," which stressed the multifactorial etiology of high blood, pressure has become a fundamental concept in modern hypertension investigation.

Except for patients with malignant or secondary hypertension, the benefits of treating high blood pressure remained unproved until the late 1960s. The "treatment era" of essential hypertension began in 1967 when Edward Freis and co-investigators reported the results of the first Veterans Administration Cooperative Study. That trial showed unequivocally that blood pressure reduction, using antihypertensive agents, markedly decreased cardiovascular morbidity in patients with severe essential hypertension (diastolic blood pressure 115-129 mm Hg). Since that landmark study, the results of additional clinical trials, the development of new antihypertensive drugs, and the educational efforts of the National High Blood Pressure Education Program have led to increasing success in the national effort to control hypertension.

As we mark May 1993 as High Blood Pressure Month, the prevalence of cardiovascular disease is decreasing, aided no doubt by the modern trend toward aggressive identification and treatment of hypertension. Discoveries of potent, endogenously produced vasoactive substances (eg, endothelins, nitric oxide, atrial natriuretic factor, and ouabain) are continuing. The complex interactions among the many hormones and organ systems that affect blood pressure are gradually being elucidated and greater attention is being directed at shared pathologic mechanisms that link hypertension with other cardiovascular risk factors, including obesity, dyslipidemia, and diabetes mellitus.

Nonetheless, major clinical questions still remain unanswered. Are diuretics and beta-blockers the best drugs for treating hypertension today, as the most recent Joint National Commission report recommends? Can our health-care system afford to pay for newer, and perhaps better, but more expensive drugs? How can we help our patients lose weight, exercise more, and restrict their sodium intake? Is it dangerous to lower blood pressure too much? Why has antihypertensive therapy had a major impact on reducing stroke but only modest success in reducing coronary events? And, the primary question - what causes essential hypertension? - continues to challenge current researchers.

Hypertension remains the most common disease in Western society, affecting nearly 30 million people in the United States alone. Hence, it is a problem that few physicians can afford to ignore. The insights of Bright, Mahomed, Page, Freis, and many others have led to great progress in understanding and treating hypertension. Their past success augurs a promising future for new advances in the investigation and treatment of this disease. I hope that this issue will stimulate your intellectual curiosity about high blood pressure and provide you with valuable information for the care of your patients with hypertension.

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## What's in a Name?

On the fifth and sixth days, says Genesis, God brought forth the nameless, countless swarms of living creatures within the waters below, in the firmament above, and upon the face of the lands; but it was man who gave them their names. Since this early name-giving orgy, man has resolutely applied titles to all newly encountered things, big or small, animate or lifeless. An earlier commentary (see "A Tale of Dry Bones," *RI Medicine*, April 1993) had deplored the lack of imagination in the names man has given to the bones of the vertebrate body, while nevertheless noting a somewhat greater creativity in the nomenclature applied to other anatomic regions.

Neuroanatomists, for example, seem to be constitutionally more adventurous than osteologists, deriving their morphological terms from fanciful resemblances to foods, garments, parts of buildings, animals (vertebrate and invertebrate) and, in an essentially colorless organ, even to colors. A few neuroanatomic terms, literally translated from Arabic to Latin, have yielded bizarre names (*pia mater*, merciful mother; *dura mater*, tough mother) because the figurative usage of the word, mother, in Arabic had not been conveyed into the Latin (cf. Saddam Hussein's "mother of all battles.")

Food seems to have occupied the minds of those responsible for naming parts of the brain. Consider, for example, the following terms: *amygdaloid* (Greek, almond-like; also, *amygdalic acid* is a derivative of bitter almonds); *lentiform* (Latin, bean-shaped); *tuber* (Latin, potato-like); *piriform* (Latin, pear-shaped); *putamen* (Latin, fruit-pit); *medulla* (Latin, marrow); and *olivary* (Latin, olive.)

Garments, or coverings, also seem to provide an unusual number of similes for neuroanatomic structures. The following examples illustrate this: *ependyma* (Greek, outer garment); *tegmentum* (Latin, a covering; see also, integument); *choroid* (Greek, membrane-like); *tapetum* (Latin, a carpet; see also, tapestry); *pallium* (Latin, a cloak; see also palliate, to mitigate or conceal); *operculum* (Latin, a cover or lid); *tentorium* (Latin, a tent or a stretched membrane); *indusium* (Latin, a tunic); and *cingulum* (Latin, a girdle).

Some neuroanatomic terms use building parts metaphorically. Consider, for example: *thalamus* (Greek, inner chamber or bedroom); *tectum* (Greek, pertaining to building; see also, architect); *fastigium* (Latin, gable or apex); *fornix* (This gets complicated. In Latin, the word signifies an arch. It was said that prostitutes gathered under certain arches in Rome, hence the parallel derivation, fornication; but an earlier meaning of the word was oven, from whence such words as furnace are derived.); and *claustrum* (Latin, enclosure, cloister; see also, claustrophobia).

Animals, real or imagined, give their names to yet other parts of the brain: *hippocampus* (Greek, horse-like sea monsters, which pulled the chariot of Neptune); *cochlea* (Greek, snail); *arachnoid* (Greek, spider-like; named for the Lydian woman, Arachne, who challenged Athena to a weaving contest, lost, and was converted into a spider); and *vermis* (Latin, worm).

The classical neuroanatomists seemed sensitive to subtle color variation in the parts of the nervous system and used the names of colors freely, beyond gray and white matter, when bestowing names on various parts. In a conventional neuroanatomical text, we encounter: *nucleus ruber* (red), *substantia nigra* (black), *globus pallidum* (pale white), *locus ceruleus* (azure blue), *substantia ferruginea* (rust-colored) and *tuber cinereum* (ashen gray; see also, cinerarium, the repository for crematorium ashes).

Perhaps because of its privileged position, the brain was the last among the organs to be dissected systematically. The anatomists may have run out of names when it came time to label the lesser parts of the brain, and they, therefore, resorted to names already assigned to other body structures. Thus, we encounter an assortment of brain structures called: tonsil, uvula, dentate nucleus, genu, geniculate body, mammillary body and, of course, ventricle, named after the Latin word for stomach.

Finally, we have names denoting structural details such as pits or depressions (fovea, vallecula), grooves (sulcus), ridges (calcar), seams (raphe, commissure) and shapes (gracilis, infundibulum, culmen). And, certainly, a vagrant nerve that wanders through the neck, thorax and abdomen will inevitably be called *vagus*.

The intracranial glands have names that reflect classical perceptions concerning their purpose in life. No function had been assigned to the pineal gland and hence, in Latin, its name denotes its pine-cone shape. The pituitary, on the other hand, was believed to play an important role in generating phlegm and thus the Latin word, *pituitarius* (meaning slime or phlegm) was adopted.

Why do we bother to name anatomic parts? Perhaps to remind us of their locations (eg, dorsal septomarginal tract), their shapes (eg, emboliform nucleus) or their purposes (eg, facial nerve).

But if unique labelling were the sole reason for naming things, a simple number might have accomplished this goal just as well. There is an old story about the annual joke-writers convention where, by custom and to save time, each known joke is referred to by its individual number. An after-dinner speaker mentions number 873, and many of the listeners burst into spontaneous laughter. A visiting reporter asks, "Why is number 873 so funny?" And one of the joke-writers replies, "We never heard that one before."

Names, rather than numbers, lend character as well as individuality to structures. They also say that man, striving for "... dominion over the fish of the sea and over the birds of the air and over every living thing that moves upon the earth," does thus place his crude mark upon them.

Stanley M. Aronson, MD

## The Determination of Blood Pressure

During the 105-year interval that witnessed the publications of William Harvey's *De Motu Cordis* (1628), Richard Lower's *Tractatus de Corde* (1669), and Stephen Hales' *Statical Essays: Containing Haemostaticks* (1733), Western medicine established a rational but elementary understanding of cardiovascular dynamics. It needed yet another 175 years before the average clinician translated these insights into practical measures and was provided with portable instruments to evaluate the heart and its vessels. The stethoscope was widely used by the second half of the 19th century. But the sphygmomanometer, a more complex apparatus, did not achieve its current design until the first decade of this century.

Many observers had commented upon variations in the quality and robustness of the peripheral pulse prior to the 18th century, but no formal attempts at pressure measurement were undertaken until Stephen Hales' deliberate experiments in 1709. Harvey and Lower had been scientist-physicians, well known and respected in Oxford and London. Hales, on the other hand, was a minister in the remote parish of Teddington. He lived a long, quiet, yet productive life, devoting most of his non-clerical energies to studies concerning the interactions and balances between the forces of nature. He was one of a number of clerics in England and the English colonies in America who saw no incompatibility between theology and the purposeful inquiry into natural sciences. In one of his texts, Hales states: "The study of Nature will ever yield us fresh matter of entertainment, and we have great reason to bless God, for the faculties and abilities he has given us, and the strong desire he has implanted in our minds to search into and contemplate his Works, in which the farther we go the more we see the signatures of his wisdom and power, every Thing pleases and instructs us because in every Thing we see a wise design."

In Hales' first published experiment, he inserted a small brass pipe into the femoral artery of a living horse. To this he attached the trachea of a goose as the flexible hose between it and a lengthy glass tube. The arterial blood, pulsating vigorously and synchronously with cardiac systole, reached an average elevation of about 12 feet within the vertical tube. Pressure in the femoral vein was more constant and did not exceed 1 foot in height. Hales was still a Fellow at Corpus Christi College, Cambridge when he first conducted these experiments.

During the next 3 decades Hales continued his experimentation on fluid pressures within both animals and plants. In 1727 he published his first monograph called *Vegetable Staticks* wherein he describes fluid transpiration, sap dynamics, gaseous exchange and other elements of botanical physiology. (The word, *staticks*, defines a branch of mechanics that studies forces at equilibrium; the etymologically related word, statistics, on the other hand, denotes the gathering, analysis and interpretation of numerical data.)

Hales' work on cardiovascular physiology, and particularly angiokinetics, led to his election as a Fellow of the Royal Society and prompted the publication in 1733 of his exhaustive studies on haemostaticks of vertebral species (confined to those animals noted by Hales to be "timorous.") Each experiment (there are 25 in all) is meticulously described, species by species, with arterial pressures measured under a range of physiologic circumstances (eg, the effects of respiration or varying posture) and pathological circumstances (eg, effects of graded blood loss or pulmonic compromise.) Studies also delved into such areas as the factors that vary venous pressure; the capacity of the left ventricle in relation to total blood volume and body size; the relationship of aortic diameter and volume of limb tissues; blood velocity in various components of the vascular tree; and numerous other investigations exploring the relationship of intact lungs and other organs to the constancy of the blood pressure and flow. His treatise, incidentally, vividly describes the clinical signs of shock secondary to blood loss.

After his ordination there is no evidence that Rector Hales had ever ventured beyond his county parish. Yet during this pastoral life, he managed to author texts and scientific papers addressing a bewildering variety of subjects including: a design of lithotrypsy forceps for bladder calculi; a system for the mechanical ventilation of prisons, barracks, hospitals and steerage compartments of ships (all adopted by the government; and proven to be successful by comparing mortality rates before and after the installation of the equipment); a fumigation apparatus, using burning sulphur, to protect stored vegetables from weevils; a technic to preserve meat by post-mortem intraarterial injections of saline; and a major, authoritative text on the health dangers of consuming gin and brandy. Dinner with this retiring cleric may not have been graced by brandy, but the worldly discussions must have been exceedingly spirited.

The interval was lengthy between the intraluminal experiments of Hales and the design of a portable instrument for the non-invasive measurement of blood pressure. Obviously Hales' technic was not feasible for humans. His contribution was not the design of a diagnostic device; rather, he provided us with an understanding of the role of blood pressure in mammalian physiology and a hint that changes in this pressure might signify abnormal states within the body. Poiseuille, decades later, recognized the impracticality of measuring the height of blood in a vertical tube. Blood tended to clot within the bore and one would need a 12 foot high glass tube to measure the systolic pressure in a hypertensive human. Accordingly, he substituted a column of liquid mercury (13.5 times heavier than blood) to reduce the height of the measuring tube, and he added a small amount of sodium sulphate solution at the arterial interphase to inhibit blood clotting. In 1828 Vierordt recorded arterial pressures in the dog adding a lever attached to a float, atop the mercury column, which scratched out a pattern

on a moving kymograph. This type of instrument, called a sphygmograph, produced a permanent tracing of the amplitudes and profiles of pulse variation but it was not calibrated to provide a numeric reading of arterial pressures.

The first instrument to quantify blood pressure indirectly (ie, without, entering the arterial lumen) is ascribed to Herrison and Gernier (1834) who, constructed a simple device consisting of a small, distensible ball (called a pelotte) filled with water and attached to a calibrated glass column partially filled with mercury. A small, flexible membrane intervened between the water and the mercury. The pelotte was pressed upon the radial artery until the more distal radial pulse could no longer be palpated and the height of the mercury was then recorded. This type of instrument was reliable only for the determination of systolic pressure. (More than 2 centuries before, Struthius had anticipated this procedure when he applied varying solid objects upon the radial artery to determine the amount of weight needed before the visible pulsation was obliterated. A few 19th century physiologists had also studied the amount of external force needed to counteract the intralumenal pressure of an artery in living persons.) In 1886 an aneroid manometer was designed to replace to vertical glass tubing.

Riva-Rocci (1896) substituted, for the pelotte, an inflatable band of rubber which surrounded the arm. Less than a decade later, Korotkow recommended that a stethoscope be applied to the antecubital fossa to obtain a more sensitive signal of the diastolic pressure.

Except for some negligible technical improvements, the 1905 model sphygmomanometer was essentially the instrument employed today. But in 1905, the instrument was viewed largely as a research tool and was used by few practitioners other than the academic cardiologists. The early decades of this century experienced an immense growth in the numbers of those applying for government service, either civil or military; furthermore, as more and more Americans applied for life insurance, the need for objective medical standards prior to issuance of policies became necessary. How might the civil service or the military know which candidates will remain healthy under the stresses created by the job ? And similarly, how might the insurance industry identify those civilians at high risk for early death ? In collating immense amounts of raw data, it became abundantly clear to the insurance companies that the blood pressure level - more than any other single clinical parameter - was an awesomely accurate determinant of life expectancy. The life insurance industry of the United States takes justified credit first in recognizing that people with high blood pressure do not live as long as those with pressures within the normal range; second, in developing normal and abnormal ranges of blood, pressures; and third, under the presumption that a healthier America meant a healthier industry, by publicizing the importance of taking blood pressures during any physical examination. Indeed, during the early decades of this century, the insurance industry deliberately sponsored the mass manufacture of inexpensive sphygmomanometers.

Medical instruments come and go. Some, such as the elegant stethokyrtograph (which measured the symmetries of thoracic amplitudes), have been retired permanently to the upper shelves of medical museums. Those portable instruments which have endured (eg, the thermometer, the stethoscope, the sphygmomanometer) are the ones which yield consistent, reproducible and diagnostically valuable insights.

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# Blood Pressure Variability and the Renal Response

Donald J. Marsh, MD

***The kidney has been though to have a causative role in essential hypertension, but despite years of research on the subject, the organ's role remains elusive.***

About 60 million people in the United States have a one-time blood pressure reading in excess of 140/90 mm Hg, and 35 million have definite hypertension, according to the criterion established by the World Health Organization, a one-time blood pressure reading greater than 160/95 mm Hg. This disease affects at least 15% of the American population. Because of the end-organ damage it causes, the disease remains one of the more important causes of mortality and morbidity in this country, despite the successes of some of the more recently introduced anti-hypertensive agents.

The kidney has been thought to play a role in causing essential hypertension. Despite years of research, however, the organ's role remains elusive. The arterial blood pressure provides the driving force for the flow of blood through the kidneys. The kidneys respond to blood pressure changes by adjusting blood vessel diameter to maintain constant blood flow. The mechanisms responsible for stabilizing renal blood flow are known collectively as renal autoregulation. Although it has been clear for many years that autoregulation can be changed in experimental hypertension, no role has been identified for the altered autoregulation as a cause of hypertension.

## Blood Pressure Variability

Experimental studies of blood pressure regulation in animals show the familiar diurnal rhythm but reveal fluctuations at many other frequencies. Our most recent studies in dogs[1] and rats[2] use analytical techniques of signal processing to analyze the frequency content of blood pressure recorded at very frequent intervals for several days. A typical recording from a normotensive rat using a miniaturized telemetering device is shown in Figure 1A. A recording made similarly from a rat with a genetic form of hypertension is in Figure 1B. A definite 24-hour rhythm is apparent in the record from the normotensive rat. Rats are more active at nights, and the highest blood pressure are recorded then. In addition to the 24-hour rhythm there are large scale fluctuations occurring more often than once a day. One cannot detect a pattern in these other fluctuations by eye, and we therefore applied a technique known as power spectral analysis, which permits one to determine whether there are regular rhythms in signals like the blood pressure. The result is shown in Figure 1C. The horizontal axis is the logarithm of the frequency. A frequency of 1 cycle per 24 hours is at the extreme left, and cycles of shorter duration are to the right. The vertical axis is the logarithm of power, an engineering term that is a measure of the signal variability. If the blood pressure had a well defined rhythm there would be a large peak in the power spectrum, but there is none. Instead there are small fluctuations at higher frequencies and larger fluctuations at lower frequencies, with a gradual transition and no distinct demarcation between zones. Such spectral patterns, called 1/f because the logarithm of the power varies inversely with the logarithm of the frequency, are well known and are, in fact, the most frequently observed in nature. This type of spectrum occurs because the very large number of arterioles that control regional blood flow throughout the body constrict and dilate primarily in response to local tissue needs and are not tightly orchestrated by central mechanisms.

Panel B shows the blood pressure record from a rat with a genetic form of chronic hypertension. The strain of rats is called Spontaneous Hypertensive Rats (SHR). The high frequency fluctuations in blood pressure seen in the normotensive rat are even more pronounced in the SHR, and the diurnal variation is less prominent. The power spectrum calculated from the SHR recording, shown in Panel D, is qualitatively similar to the spectrum from the normotensive rat, but the power at the highest frequencies is 10 times as great as in the normotensive. This result confirms the qualitative impression that the high frequency fluctuations are larger in the SHR. For the kidney, this means that the burden placed on renal autoregulation by the fluctuations in blood pressure is much greater in the hypertensive rats. This pattern of increased fluctuations in SHR, sustained over days and months, could accelerate the pattern of end organ damage.

## Renal Blood Flow Regulation

The pressure measured in the aorta is, of course, the same as the pressure at the inlet to the arteries that distribute blood to organs like the kidneys. Because the arterial pressure fluctuates in response to blood vessel contractions in many arterioles outside the kidney, most of the variability in the blood pressure is unrelated to renal processes. Kidney processes often are dependent on arterial pressure and blood flow rate, and blood pressure variability may prevent kidneys from achieving homeostasis. Renal auto-

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***ABBREVIATIONS USED***

***SHR: Spontaneous hypertensive rats***

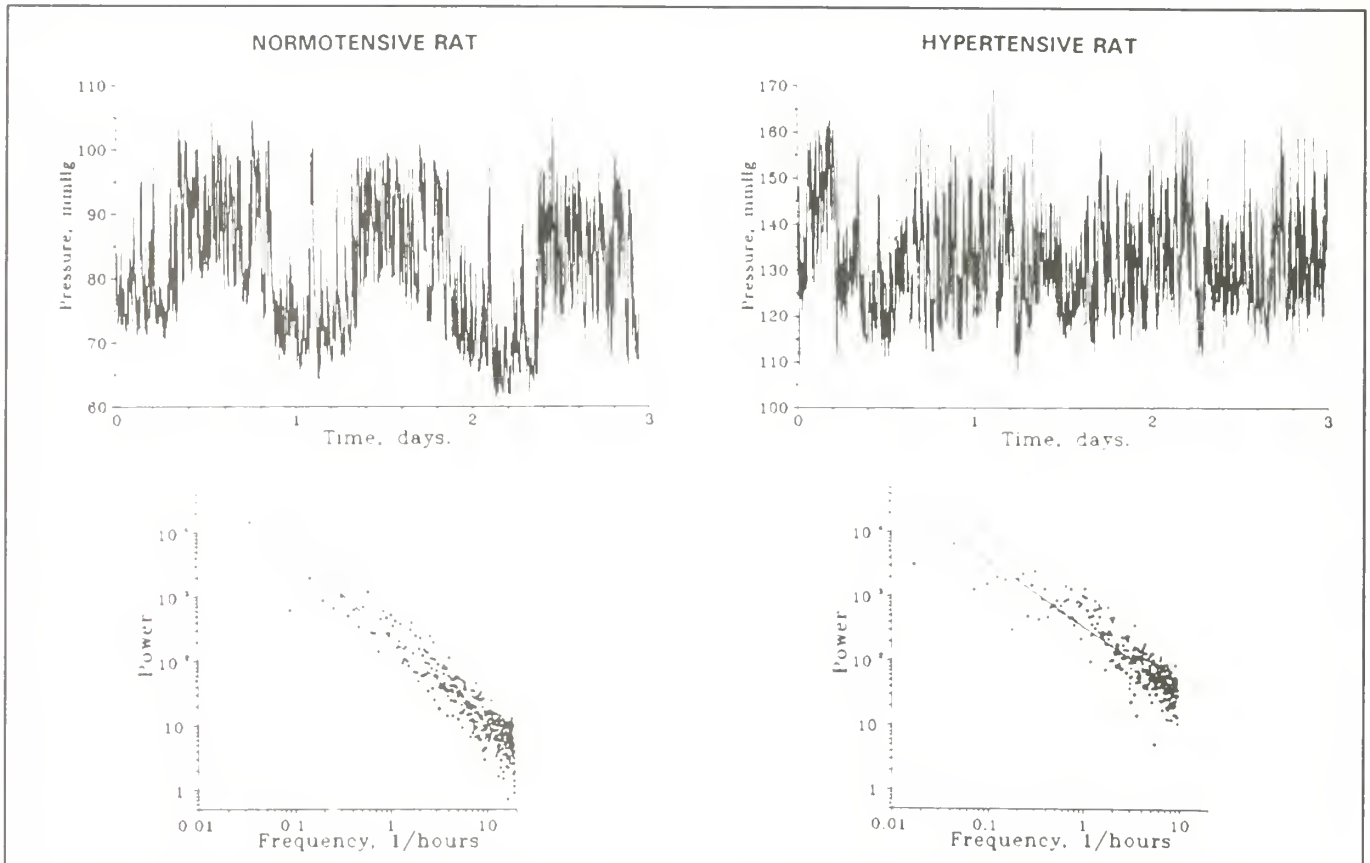


Fig 1.—Blood pressure recorded continuously from a normal rat for 3 days (A). Beat-by-beat variations have been removed by electronic filtering. Blood pressure recorded continuously from a rat with a genetic form of chronic hypertension (B), recorded for 3 days and filtered electronically. Power spectrum from record A (C). Power spectrum from record B (D).

regulation is an efficient process of local blood flow control that responds automatically to fluctuations in arterial blood pressure by making adjustments in the diameter of preglomerular renal arterioles. The result of renal autoregulation is to buffer the kidney from many of the arterial pressure fluctuations. Over frequencies ranging from 1 cycle per 10 seconds to 1 cycle per 8 hours, autoregulation filters out about 70% to 80% of the fluctuations in blood pressure. This range of frequencies contains virtually all of the variability that has the 1/f property described earlier. This action of autoregulation is sufficient to permit the kidney to regulate the excretion of the various electrolytes, water, and other solutes that represents its main homeostatic task.

There are two signals for renal autoregulation: one originates in the composition of tubular fluid and the other in the tension of the wall of a renal arteriole. The composition of the tubular fluid is determined in part by the pressure in the glomerular capillaries that provides a force acting over the surface of glomerular capillaries to cause glomerular filtration. The glomerular filtrate is largely reabsorbed by tubular cells, and the rate of reabsorption and the composition of the tubular fluid are dependent on the rate of glomerular filtration. A signal derived from the tubular fluid sodium chloride concentrations is sensed by a special group of tubular cells and transmitted through a negative feedback mechanism to the preglomerular arterioles that regulate renal blood flow. One of the most important tasks the kidneys has is the regulation of extracellular volume. They carry this out by regulating the excretion of NaCl to match the dietary intake to maintain the total body mass of NaCl within narrow bounds. The feedback system regulating renal blood flow is appropriately placed to support the regulation of NaCl excretion in response to whole body volume needs because it senses variations in NaCl concentration caused by blood pressure fluctuations, and adjusts renal vascular resistance. The effect of the feedback system is to reduce the fluctuations in NaCl excretion that might be caused by fluctuations in blood pressure.

## Natural Dynamics of Renal Blood Flow

This feedback system, which is the more important of the two mechanisms responsible for autoregulation, has a naturally occurring oscillation in normal rats.[3] The oscillation is measured most easily in the hydrostatic pressure in the tubules, although we have also found it in blood flow, in tubular fluid flow, and in the composition of the tubular fluid in the tubular segment that contains the sensor for the feedback system. The natural frequency is 2 cycles per minute. Feedback systems frequently have oscillations, and the local blood flow control mechanism in the kidney provides another example of this phenomenon.

The renal oscillation undergoes a most interesting change in at least two different forms of hypertension, one

the genetic form mentioned earlier, SHR, and the other a renovascular model of hypertension formed by placing a permanent partial occlusion on one renal artery.[4] An example of the normal oscillation and of the change in hypertension is shown in Figure 2. We have excluded sources of noise and have subjected the data to tests that indicate the process is an example of an exciting new class of patterns referred to as deterministic chaos.

Deterministic chaos was first described by the meteorologist Lorenz who was interested in deciding if the weather was predictable in principle. Since he could not provide a general answer to this question he decided instead to determine if the weather might be unpredictable in principle. He tested this idea by finding a rather simple set of 3 equations that, when solved, yielded an irregular pattern in each of the unknowns not unlike that seen in Figure 2B. The equations were approximations to a crude weather-like process, and more complicated equation sets show the same type of behavior. When he plotted the three unknowns against each other, rather than each against time, he found a complex, beautiful, and very ordered picture. Although the pattern of each variable in time appeared unpredictable, the pattern in the three dimensional plot was orderly and highly correlated. This type of behavior has now been studied quite extensively and found to be widespread in nature. Brain wave patterns frequently show chaotic behavior, and there are other biological examples, some of which are found in disease states, and others in normal conditions.

This change from an oscillation to deterministic chaos suggests at least two new lines of inquiry. The first is directed to the cause of chaos in hypertension, and the second to the role of the kidney in causing hypertension. Chaotic dynamics for autoregulation in hypertension arise from completely deterministic systems. Even though the signal looks like noise it reflects an underlying order that one can expect to understand. The oscillating renal feedback system is understood to the point that we have a mathematical model that makes accurate quantitative predictions. An oscillation is the usual starting point for a change to chaos and is usually achieved by making a small change in a single parameter of the system. The implication is that a single change in one component of the renal feedback system is sufficient to have caused a chaotic pattern to emerge. Experimental tests therefore can be conducted to determine what changes have occurred that might have caused the transition, and the measured values can be inserted into the mathematical model to test whether some measured change is indeed responsible.

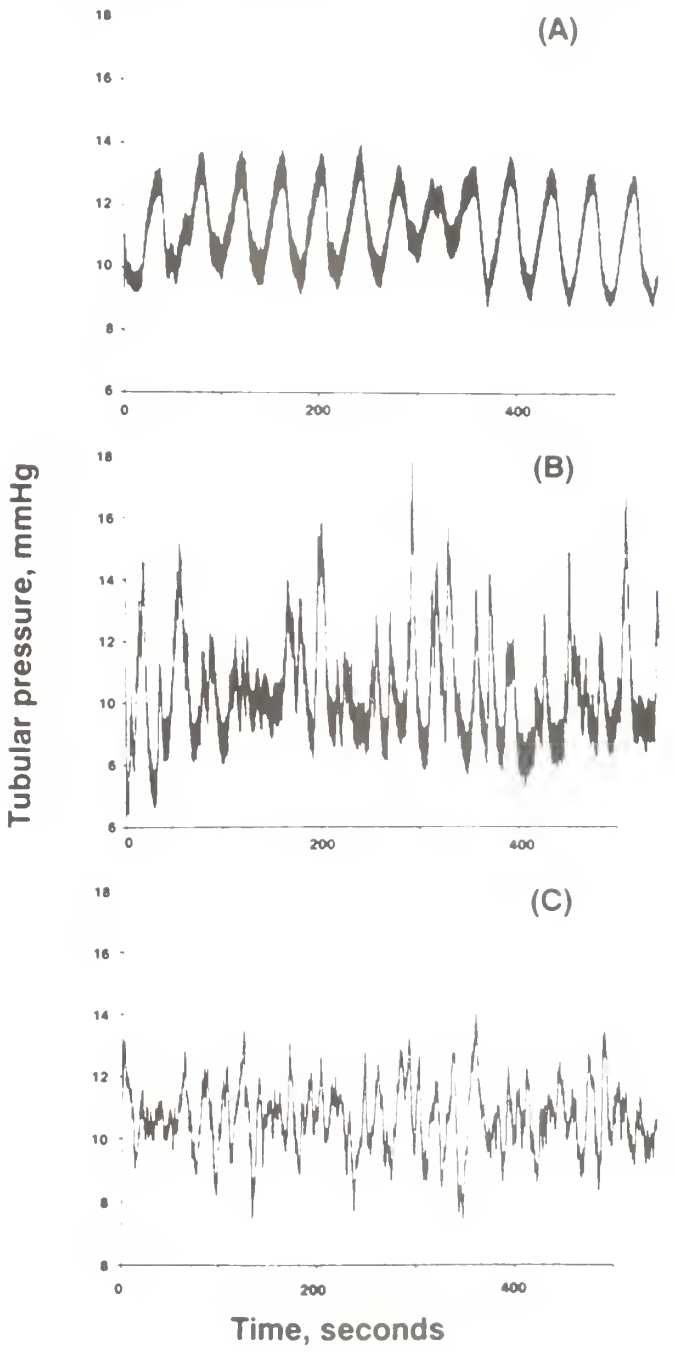


Fig 2.—Renal tubular pressure recorded from a normotensive rat (A). Renal tubular pressure recorded from a rat with a genetic form of chronic hypertension (B). Renal tubular pressure recorded from a rat with renovascular hypertension (C).

## Conclusions

The fundamental question at issue is whether the change in the kidney that causes chaos is responsible for causing hypertension. One possible explanation for the transition in kid-

ney blood flow dynamics is that the elevated mean arterial pressure causes a change in the kidney such as arteriolar hypertrophy that is responsible for the transition to chaos. If this hypothesis is correct, chaos will have proved to be another interesting but arcane consequence of hypertension, and we still will not know how the kidney causes the systemic disease. Another possibility is that the change from an oscillation to chaos is the fundamental lesion that causes hypertension, either because the change in the dynamics causes a change in the pattern of blood pressure variability that then leads to an elevation of arterial blood pressure, or because a series of events within the kidney that leads finally to hypertension. Time alone will tell.

***There are two signals for renal autoregulation: one originates in the composition of tubular fluid and the other in the tension of the wall of a renal arteriole.***

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# Protecting the Kidney in Hypertension

Marc S. Weinberg, MD, FACP
Richard A. Cottiero, MD
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***Currently, 120,000 people live on maintenance renal therapy, either chronic dialysis or renal allografts.***

Hypertensive nephrosclerosis comprises about 26% of all end-stage renal disease (ESRD) in the United States, afflicting more than 30,000 people annually. Fortunately, much recent research has focused on the preservation of renal function, resulting in many advances in maintenance therapy. Consequently, for many, deterioration of renal function has slowed.

Currently, 120,000 people live on maintenance renal therapy, either chronic dialysis or renal allografts, costing more than $3 billion per year or $25,000 per patient. The motivation to find adequate treatments to arrest renal deterioration in hypertensive patients, therefore, is significant. It is commonly accepted that controlling blood pressure also protects against kidney failure. Patient groups at particularly high risk of developing progressive nephropathy associated with hypertension, despite successful pharmacologic intervention, include the elderly, blacks, diabetics, and patients with mild pre-existing renal disease.

Recent advances in reducing renal damage in hypertensive patients use pharmacologic as well as other interventions. These therapeutic modalities include drugs such as angiotensin converting enzyme (ACE) inhibitors, calcium channel blockers, and alpha-2 antagonists. Nonpharmacologic measures include weight reduction, low-protein and low-cholesterol diets, and tight blood sugar control.

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Progressive Renal Disease

The renin-angiotensin-aldosterone system is one of several neurohormonal mechanisms that regulate fluid exchange in the kidney. Renal function usually is evaluated by measurements of the glomerular filtration rate (GFR) and/or plasma BUN and creatinine. Artificially high levels of these rates exert stress on the glomerular tissues, and ultimately compromise the integrity of the kidney mass itself.

Determining how renal insufficiency associated with hypertension develops has been the object of intensive research during the past 6 years. Histologically, a kidney in ESRD shows reduction in mass, loss of glomerular capillaries, proliferation of cells, scarring, tubular atrophy, diffuse fibrosis, and thickening of the glomerular basement membrane. Glomerular sclerosis, the hallmark of hypertensive renal disease, occurs as the glomeruli are injured by several mechanisms. Hemodynamic factors such as elevated glomerular capillary hydraulic pressure (intraglomerular hypertension) with glomerular hyperperfusion have been postulated to play a major role in the progression of glomerular sclerosis. Proteinuria is the earliest clinical manifestation, while subsequent reductions in both GFR and RBF, manifested by increases in BUN and creatinine, follow. The ability of the kidney to concentrate the urine and excrete acid is also compromised. The subsequent damage or loss of glomeruli has secondary effects, initiating more atrophy and further loss of renal mass.

Metabolic disorders such as diabetes and hyperlipidemia contribute to glomerular injury. Elevated lipid levels (hyperlipidemia) have been identified recently as a risk factor for progressive renal disease, independent of glomerular hemodynamic changes.[1] This observation has significant clinical implications in light of ongoing efforts to reduce the consumption of fats and cholesterol in the American diet.

Cellular factors also cause or exacerbate glomerular injury, including the deposition of biologically active compounds (eg, IgG, complement, lipoproteins, toxins, etc.), intra- and extracapillary coagulation, accumulation of the mesangial matrix, and infiltration of the interstitium by inflammatory cells, especially macrophages and lymphocytes.

In summary, the link between glomerular sclerosis and hypertension can be articulated as follows: First, glomerular hypertension leads to progressive glomerular injury. Second, the prevention, arrest, or regression of progressive glomerular injury can be effected by the prevention or early reversal of glomerular hypertension. Third, where glomerular injury is heterogeneous, there should exist a direct correlation between the maximum glomerular capillary pressure and the degree of sclerosis in the same glomerulus.

## Role of Drug Therapies

### *ACE Inhibitors*

Research has shown that angiotensin converting enzyme (ACE) inhibi-

***ABBREVIATIONS USED***
***ACE: Angiotensin converting enzyme***
***BUN: Blood urea nitrogen***
***ESRD: End-stage renal disease***
***FDA: Food & Drug Administration***
***GFR: Glomerular filtration rate***
***HDFP: Hypertension Detection Follow-up Program***
***IgG: Immunoglobulin G***
***LDL: Low-density lipoprotein***
***MRFIT: Multiple Risk Factor Intervention Trial***
***NIDDM: Non-insulin dependent diabetes mellitus***
***RBF: Renal blood flow***

tors slow, halt, or, in rare cases, reverse the progression of glomerular sclerosis in hypertension and diabetes, two diseases that cause more than half of all new cases of ESRD.[1] ACE inhibitors exert their antihypertensive effect by inhibiting the action of angiotensin converting enzyme, and, as a result, lowering the availability of angiotensin II, a potent vasoconstrictor. In addition, ACE inhibitors stimulate the production of vasodilatory kinins.[2] Inhibition of the serum, vascular, and tissue renin-angiotensin-aldosterone systems may be an important factor in understanding the role of ACE inhibitors in limiting glomerular sclerosis and systemic vascular hemodynamics. ACE inhibitors also directly affect mesangial contractility and the glomerulus.

In patients with essential hypertension, ACE inhibitors exert variable effects on renal function. An increase in RBF is observed, whereas the GFR increases or usually remains unchanged. Plasma renin levels increase. Plasma angiotensin II and aldosterone levels decrease. Urinary protein excretion in hypertensive patients decreases following therapy with ACE inhibitors.[3] Indirectly, this may be beneficial by causing a reduction in plasma cholesterol levels with subsequent preservation of glomerular basement membrane integrity and function.

In diabetic patients, ACE inhibitors reduce urinary protein excretion in normotensive and hypertensive patients.[3] ACE inhibitors are also effective in reducing blood pressure in hypertensive diabetic patients as well as essential hypertensives.[1] An Australian study[4] reported that the ACE inhibitor, perindopril, prevented increases in albuminuria in normotensive diabetic patients and decreased albuminuria in hypertensive diabetic patients. Zucchelli also demonstrated that ACE inhibitors may have a renoprotective effect.[5]

The mechanism whereby ACE inhibitors apparently greatly reduce proteinuria, regardless of the underlying renal disease[1] is unknown. In patients with renal disease, both short-term and long-term studies show that ACE inhibitors cause an increase in renal plasma flow, which then decreases the filtration fraction and, theoretically, reduces glomerular hypertension. The full effect of ACE inhibitors on renal disease has yet to be elucidated.

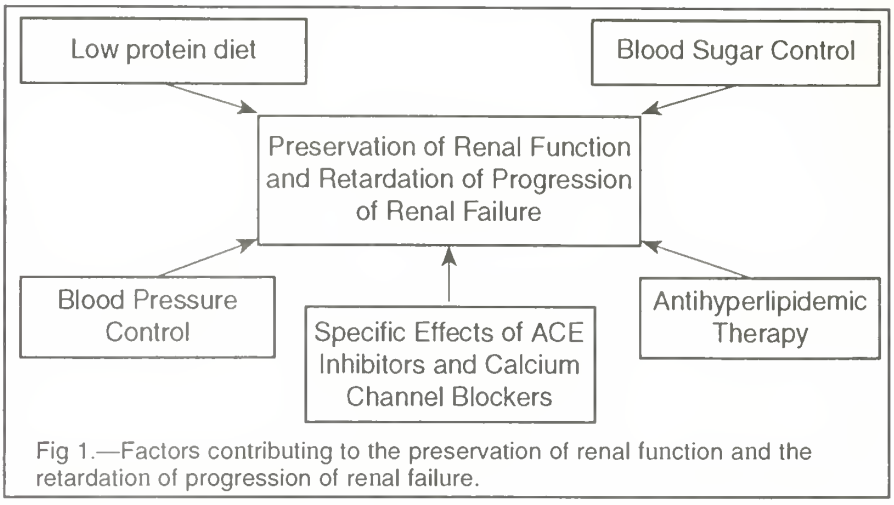
Low protein diet
Blood Sugar Control
Preservation of Renal Function and Retardation of Progression of Renal Failure
Blood Pressure Control
Specific Effects of ACE Inhibitors and Calcium Channel Blockers
Antihyperlipidemic Therapy

Fig 1.—Factors contributing to the preservation of renal function and the retardation of progression of renal failure.

### *Calcium Channel Blockers*

The effect of other classes of antihypertensive treatment on glomerular sclerosis is much less clear. Calcium channel blockers exert their antihypertensive effect by reducing the peripheral vascular resistance and glomerular afferent arteriolar pressure, and by blocking the vasoconstricting action of norepinephrine and angiotensin II. Unlike ACE inhibitors, calcium channel blockers are more variable in their effect on the renal microcirculation. Like ACE inhibitors, however, they tend to improve RBF and are more consistent in increasing GFR.

***. . . the prevention, arrest, or regression of progressive glomerular injury can be affected by the prevention or early reversal of glomerular hypertension.***

Calcium channel blockers with nondihydropyridine structures are associated with some amelioration in progressive renal disease, but this effect is not as pronounced as with ACE inhibitors.[3] These agents are thought to exert their protective effect by reducing tubular hypermetabolism, vascular accumulation of calcium, and/or attenuating glomerular hypertrophic changes due to hemodynamic alterations in renal afferent tone, vascular resistance, and glomerular ultrafiltration pressure.[3]

The antiproteinuric effect of various classes of calcium channel blockers differs somewhat among different agents and may be due to alterations in glomerular hemodynamics, glomerular permeability to proteins, or possibly tubular handling of filtered proteins.[3] In hypertensive patients with non-insulin dependent diabetes mellitus (NIDDM), diltiazem and verapamil (nondihydropyridine agents) were found to decrease proteinuria to the same extent as lisinopril, an ACE inhibitor. Diltiazem demonstrated an anti-proteinuric effect at the efferent arteriole similarly to ACE inhibitors. Unlike diltiazem and verapamil, nifedipine (a dihydropyridine agent) was shown in earlier trials to increase proteinuria in diabetic patients with impaired renal function. More recently, however, nifedipine showed similar effects as perindopril in lowering urinary protein excretion and in providing renoprotection.[4] Zucchelli found that the renoprotective effect of calcium channel blockers and ACE inhibitors was similar when studying the comparative long-term effects of captopril and nifedipine on progressive renal insufficiency in humans.[5]

An interesting study using a combination calcium channel blocker and ACE inhibitor for high-risk hypertensive patients with NIDDM and proteinuria has recently been reported.[3] The combined agents reduced the rate of decline in GFR over 1 year to a greater degree than either drug used individually. Greater reductions in proteinuria also were observed with the combined drugs. Weir suggested that if proteinuria is a major antecedent to renal sclerosis, then the "addi-

tive reduction in urinary protein excretion mediated by these two different classes of antihypertensive agents may be of greater benefit in protecting renal function."[3] Further research is needed to clarify any protective role calcium channel blockers might have on maintaining the integrity of renal mass in hypertensive patients.

### *Other Drugs*

Among other pharmacologic antihypertensive agents, diuretics have not been shown to have any specific renal benefits, either when used alone or in combination treatments. Weir reports that results from both the HDFP trial and the MRFIT study show that diuretics are not renoprotective.[3] A high mortality rate was reported in other studies of patients using diuretics for hypertension and diabetes. As with calcium channel blockers, some form of combination therapy may be appropriate, ie, one that controls blood pressure while maintaining renal blood flow and providing the benefits of renal protection.

Alpha-blocking agents and sympatholytics essentially are vasodilators that decrease systemic vascular resistance with no significant alterations in cardiac index. Little data is available on a primary renoprotective effect beyond blood pressure control and lipid reduction effects on the glomeruli. In animal models (hypertensive rats), nonspecific vasodilators (hydralazine and minoxidil) have not prevented nephrosclerosis.[3] Conclusive results have yet to be demonstrated.

## Non-Drug Therapies to Protect the Kidney

Several nonpharmacologic treatment methods can be recommended. Weight management and exercise are widely accepted factors in controlling blood pressure. Obesity is clearly a known risk factor for hypertension and, hence, can potentially exacerbate renal disease. There is no known benefit of either sodium chloride or potassium restriction, or calcium supplementation on renal function.

Control of dietary protein is a current treatment for arresting the progression of renal disease. Low-protein diets have been shown to reduce the risk of progressive glomerular hypertrophy and elevation in intraglomerular pressure and flow in animals. Protein restriction also reduces serum lipid levels and immune cell activation, two factors that may contribute to renal sclerosis. Low protein diets (0.6 g protein/kg/day) have been shown to slow the progression of human renal disease in patients with advanced renal insufficiency.[6]

Finally the control of elevated serum lipid levels also plays a role in protecting the kidney. Patients with renal disease have been shown to have abnormalities in lipid metabolism that can promote further renal damage. Two possible mechanisms have been proposed. Excessive levels of lipoproteins in the serum can lead to "trapping" of lipids by mesangial cells, which proliferate and result in focal sclerosis. Alternatively, low-density lipoproteins (LDL) can cause monocytes to adhere to endothelial cells, leading to inflammatory glomerular disease.[7] HMG-CoA reductase inhibitors can effectively lower elevated lipid levels in patients with nephrotic syndrome. Diets low in fats and cholesterol can help control lipid levels, and hence may contribute to maintaining the long-term integrity of the kidney.

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## Conclusions

Several major conclusions can be drawn when considering the problem of protecting the integrity of the kidney in hypertensive patients. First, ACE inhibitors and calcium channel blockers are currently the most effective antihypertensive agents that can maintain renal perfusion, while controlling blood pressure and protecting renal mass.[3] Second, combination therapy (ACE inhibitor and calcium channel blocker) may be the best form of therapy to preserve renal function in high-risk hypertensive patients with NIDDM and proteinuria.[3] Third, ACE inhibitors dramatically reduce proteinuria in many clinical syndromes of renal disease and retard the rate of progression of renal disease.[5] Figure 1 is a summary diagram that synthesizes the factors contributing to the preservation of renal function.

As a closing thought, some ethical and legal questions should be considered. The therapeutic agents described here have been approved by the FDA to treat one condition (hypertension), yet are being studied in humans for treatment of another condition (progressive renal disease) outside the traditional FDA approval system.[1] This situation might lead to patients being exposed to some unanticipated complications or adverse effects.

Future studies will determine whether the use of ACE inhibitors and calcium channel blockers will become the optimal treatment method for patients with both hypertension and compromised renal function. On the basis of the current literature, meticulous control of hypertension (preferably with ACE inhibitors and/or calcium channel blockers), control of hyperlipidemia, and a low protein diet should be implemented in hypertensive patients with established renal insufficiency.

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## Acknowledgements


The authors wish to thank Renee Hanewich, coordinator of our Hypertension-Chronic Renal Failure Clinical Research Program, Jill Weinberg, Deborah Margolis, as well as Carole S. Mousalli for her editorial assistance.



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# Practical Approach to Hypertension In Children and Adolescents

Andrew S. Brem, MD

***At least three or more readings of blood pressure equal to or greater than the 95th percentile, adjusted for sex and age, in either the systolic or diastolic reading, is the consensus view for pediatric hypertension.***

In years gone by, hypertension was considered to be the exclusive domain of the internist. Children presenting with signs and symptoms of blood pressure elevation were the esoteric subject of grand rounds. The limited number of cases of hypertension reported in the older literature and textbooks were probably because blood pressure determinations were not made routinely on infants and young children. As intensive care units for children came into being, electronic monitors and direct intra-arterial transducers joined the aneroid blood pressure cuff as blood pressure monitoring devices for small children.

Even with many of these new devices, a few caveats remain in obtaining an accurate blood pressure determination in a child or adolescent. When any inflatable cuff is used, the distensible portion of the cuff should cover at least 80% of the circumference of the extremity in which the blood pressure is being taken. A smaller cuff may account for a significant overestimation of the blood pressure because of uneven compression of the artery. Moreover, the child having the blood pressure taken should be at rest with the cuffed extremity being maintained at heart level. Obviously, a frightened or recently exercised child is likely to have a much higher blood pressure reading than one at rest.

Perhaps the biggest concern a primary caretaker has in making a blood pressure determination is the interpretation of the readings. Which Korotkov sounds should one pay attention to in recording the systolic and diastolic blood pressure in a young child? The first Korotkov sound (the initial tapping) corresponds to the systolic blood pressure. The second and third Korotkov sounds are generally thought to correspond to turbulent flow of blood through an artery narrowed by the cuff. The fourth Korotkov sound is the point where the sound becomes decreased or muffled; the total disappearance of sounds represents the fifth Korotkov sound. In adolescents and adults, the fifth Korotkov sound is generally accepted as a close approximation of the diastolic blood pressure. However, in younger children, one may hear sounds all the way to zero as the blood pressure cuff is deflated. In this situation, the change in sound or the fourth Korotkov sound is thought to be a reasonable approximation of the diastolic reading.

Normative blood pressure data on children from infancy through adolescence have been fashioned into standard statistical bell shaped curves that clearly depict a 90th and 95th percentile for systolic and diastolic blood pressure. These epidemiological studies have aided in the development of a clear definition of pediatric hypertension. At least three or more readings of blood pressure equal to or greater than the 95th percentile, adjusted for sex and age, in either the systolic or diastolic reading is the consensus view for pediatric hypertension. It should come as no surprise then that about 4% to 5% of children exceed the 95th percentile in either systolic, diastolic or both blood pressures after only a single reading, consistent with the statistical bell shaped curve. In large screening studies using repeated measurements, persistent blood pressure elevation seems to occur in less than 1% of children. Thus, a single reading exceeding the 95th percentile generally is not sufficient to establish the diagnosis of persistent hypertension. This is especially true in adolescents who may have occasional blood pressure readings just at or above the 95th percentile.

## Diagnosis

Elevation in blood pressure is a physical finding and not a diagnosis. Consideration of the differential diagnostic possibilities is the key to a rational approach to evaluation and treatment. From many available surveys, most children presenting with persistent elevation in blood pressure before the age of 10 years are likely to have secondary hypertension, ie, a definable cause of their elevation in blood pressure. Renal parenchymal diseases including cystic diseases, glomerulonephritis, and renal dysplasias account for approximately 78% of the secondary causes of hypertension. Roughly 12% of children with secondary hypertension will have renal artery lesions with associated stimulation of the renin angiotensin system. In contrast to adults who develop plaques in the aorta and renal arteries, children and adolescents have renal artery lesions most often caused by fibromuscular dysplasia. Fibromuscular dysplasia is particularly prominent among young white women. Some patients with neurofibromatosis develop renal artery stenosis as a result of obstructing neurofibromas within the artery wall. Renal artery thrombosis or emboli have been seen in young infants

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***ABBREVIATIONS USED***
***BID: twice daily* (bis in die)**
***PO: by mouth* (per os)**
***QD: daily* (quaque die)**

who have had an umbilical artery catheter placed for monitoring. Fortunately, the hypertension observed in these young infants resolves within months as the vessel recannulates. Coarctation of the aorta accounts for 2% of the secondary causes of hypertension in children. The aortic murmur and decreased pulses in the lower extremities make this diagnosis one that can often be established at bedside. From the number of publications generated over the years, it is rather surprising that endocrine-mediated causes of hypertension account for only about 8% of the cases of secondary hypertension. This includes the adrenal disorders such as Cushing's disease, the syndromes of mineralocorticoid excess, and excessive catecholamine production. Thyroid disorders also have been linked to elevation in blood pressure as a wide pulse pressure and elevated systolic readings often are noted in patients with hyperthyroidism.

Similar to adults, older children and adolescents with persistent blood pressure elevation will likely have a diagnosis of primary or essential hypertension. Often, there is a strong family history of at least one parent with essential hypertension. On physical examination, the adolescent may have a relative tachycardia at rest, consistent with the presumed autonomic nervous system imbalance thought to contribute to the disease. Patients may exhibit an inappropriately elevated cardiac output for the degree of vascular resistance in the periphery, thereby leading to elevation in blood pressure.

Since the mechanism or mechanisms involved with the development of essential hypertension are as yet unknown, other hypotheses also have been proposed to explain the resultant rise in blood pressure. One view is that there is an altered cellular membrane sodium or calcium transport, especially involving vascular smooth muscle. The net result is that intracellular calcium ion activity in vascular smooth muscle attains a steady state that is higher than the norm, resulting in smooth muscle contraction and an increase in vascular resistance. Subtle endocrine abnormalities have also been suggested as a mechanism for essential hypertension. Altered peripheral metabolism of circulating endogenous glucocorticoids is one example of a subtle endocrine abnormality that can produce hypertension (see paper by D. Morris in this issue).

Table 1.—Commonly Used Antihypertensive Medications.

| | Dosage | Frequency and Route |
|---|---|---|
| **Diuretics Single** | | |
| furosemide | 1-2 mg/kg | QD P.O. |
| chlorthalidone | 0.5-1 mg kg | QD P.O. |
| hydrochlorothiazide | 1-2 mg/kg | QD P.O. |
| spironolactone | 1-2 mg/kg | BID P.O. |
| **Beta-Blockers** | | |
| propranolol | 1-3 mg/kg | BID P.O. |
| atenolol | 1-2 mg/kg | QD P.O. |
| labetalol[1] | 0.2-0.75 mg/kg | titrate I.V. |
| **Vasodilators** | | |
| hydralazine | 1-5 mg/kg | q 6-8 h P.O./SQ |
| diazoxide[2] | 5 mg/kg | I.V. bolus |
| nifedipine | 0.3-0.5 mg/kg (0.34 ml/10mg) | q 6-8 h P.O./SL |
| **Converting Enzyme Inhibitors** | | |
| captopril | 0.5-2 mg/kg | q 8 h P.O. |
| enalapril[3] | 0.312-1.25 mg | q 6 h I.V. |
| | 1.25-10 mg | QD P.O. |

[1] most useful in patients in an ICU with CNS mediated hypertension
[2] only given once or twice in the presence of continuous blood pressure monitoring; if required, at least 45 minutes should pass before the second dose is given.
[3] no clear dose/kg body weight has been established; one should begin with the lowest dosage when using either the I.V. or oral preparation

Adolescents with borderline elevation in blood pressure are perhaps the most difficult to diagnose. Generally, school-age children tend to track on percentile curves over time. Thus, a child entering school with blood pressure readings at the 90th percentile may well have readings at the 90th percentile when they complete high school. About 70% of the individuals with borderline elevation in blood pressure will continue to have readings in the same range over the years. Thus, one might well argue that interventions in this population are not necessary, given the strong likelihood that readings will continue in the normal or high normal range over time. It is important, however, to continue monitoring these individuals looking for deviations that might indicate more severe disease.

An evaluation of hypertension in the pediatric population must not only be medically appropriate but cost-effective. Using the epidemiological data, one can form an index of suspicion on the basis of age and symptom complex. An adolescent with a strong family history of hypertension may need minimal assessment. A good history and physical examination together with routine screening laboratory studies including a urine analysis, serum electrolytes, creatinine and blood urea nitrogen may be sufficient. Blood pressure measurements rising progressively over a short period of time (6 months to a year) may be indicative of renal vascular hypertension from fibromuscular dysplasia. In younger children presenting with elevation in blood pressure, the same screening studies should be performed as mentioned above. Here, selective radiographic studies may also be helpful, looking specifically for renal parenchymal disease. Such studies might include a renal ultrasound, intravenous pyelogram or renal nuclear medicine screening. A renal biopsy is occasionally useful in diagnosing certain glomerular diseases.

Renin profiling, ie, the measurement of peripheral plasma renin activity as a function of dietary sodium intake, is occasionally helpful in diagnosing secondary causes of hypertension. Syndromes of mineralocorticoid excess may present with a mild hypokalemic alkalosis and low renin activity. In contrast, patients with renovascular disease may also present with

mild hypokalemic alkalosis but with high renin activity. An arteriogram should be reserved only for those pediatric patients who have a clear indication of having renal vascular disease such as abdominal bruit, suggestive renal scan or ultrasound, or elevated plasma renin activity. Routine measurements of cortisol, its metabolites, aldosterone, catecholamines, and/or thyroid studies should be reserved for selective cases where there appears to be a historical, physical or laboratory indicator that one of those processes may be involved in mediating the hypertension.

***Often, there is a strong family history of at least one parent with essential hypertension.***

The goal of therapy should be to normalize the blood pressure in order to minimize cardiovascular and renal morbidities. This goal must be accomplished with the fewest side effects and at least cost to the patient, both economically and socially. The urgency to initiate treatment must be determined by the relative risk. Malignant hypertension is a life-threatening process that requires immediate attention, whereas borderline elevation in blood pressure can be approached in a more circumspect way. In discussing therapeutic interventions, it's important to realize that they must be minimally disruptive to the patient's lifestyle to ensure maximal compliance. Cost and compliance are particularly important issues since the average teenager who feels well finds it difficult to accept the concept that a process affecting him or her in the present can be associated with a long-term illness.

Dietary intervention is the most cost-effective and worthwhile intervention. It is also one of the most difficult to implement, since it often requires changing the entire family's lifestyle and eating habits. Many individuals with both primary or secondary hypertension will have a sodium-sensitive component, and lowering the diet to a modest no-salt-added (3 gm sodium per day) can be therapeutic. Such a diet restricts the intake of most fast foods and sodium processed foods such as luncheon meats, canned soups, or canned pasta products. A generalized program of weight loss and exercise is also clearly beneficial especially in obese children and adolescents.

In more severe cases, medication is required to control blood pressure. Since most pharmaceutical companies have chosen not to conduct the appropriate studies necessary for approval, most if not all of the medications that are currently being used have not been approved for use in the pediatric population. Thus, dosing of these medicines has often been based on extrapolation from adult doses. Three drugs have been used to treat malignant hypertension in an emergency room setting. These include nifedipine administered sublingually, hydralazine given either subcutaneously or intravenously, and diazoxide given rapidly via the intravenous route. The only goal of treatment in the emergency room is to reduce blood pressure to a level where immediate danger to the kidneys, heart or brain is averted. Chronic antihypertensive therapy must be tailored to the needs of the patient. Now most medications available on the market can be prescribed on a daily or, at most, b.i.d. basis, which improves compliance considerably. These agents generally affect circulating volume (diuretics), cardiac output (beta-adrenergic blockers), or vascular resistance either directly or indirectly (calcium channel blockers, peripheral vasodilators, alpha adrenergic blockers). A list and approximate dosing schedule of some selected agents are provided in Table 1.

***The goal of therapy should be to normalize the blood pressure in order to minimize cardiovascular and renal morbidities.***

The diagnosis and management of pediatric patients with hypertension is a multifaceted problem. One is not only dealing with an individual patient, but with his or her family. Child development plays a considerable role in patient compliance, as was alluded to in the teenage population where patient denial and a sense of invincibility are significant factors. Dosing of medication often can be difficult, since these medications have not been formulated for use in children. A delicate balance must be achieved between the morbidity of the hypertension and the morbidity and cost of the medication. The primary care physician's greatest contribution lies in the early discovery and documentation of this perplexing problem.

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# Hypertension in Pregnancy

Karen Rosene Montella, MD
Rita S. Kurl, MD

***... it is the etiology, not the degree of hypertension, that appears to have the greatest influence on perinatal outcome.***

Hypertension is the most common medical disorder seen in association with pregnancy, complicating 5% to 10% of all gestations. Identifying the cause of hypertension that occurs during pregnancy is of considerable importance since the management and prognosis of chronic hypertension, which precedes pregnancy, differs greatly from that of preeclampsia, which is unique to pregnancy.

Blood pressure during pregnancy is usually measured with the patient in the sitting position since there is the least variability in measurement with this position. Blood pressure may fall by as much as 10 to 14 mm Hg in the supine and left lateral recumbent positions. Although there is considerable controversy over whether Korotkoff phase IV, muffling of sound, or Korotkoff phase V, disappearance of sound, is the preferred measure of diastolic blood pressure in pregnancy, recent studies have demonstrated that phase V is a more accurate reflection of intraarterial diastolic blood pressure during pregnancy. For this reason, most authors recommend the use of Korotkoff phase V in most instances. If there is a large discrepancy between phase IV and V sounds, then the use of phase IV for diastolic readings in certain individuals is preferred.

Interpretation of blood pressure levels in individual patients must take normal pregnancy levels into consideration. As early as 1969 it was noted that in the majority of normal pregnant women, blood pressure decreases during pregnancy, reaching a nadir at 16 to 20 weeks' gestation and then gradually rising back to baseline at term (Figure 1). The reduction in blood pressure is accompanied by a 40% increase in blood volume and cardiac output. Invasive hemodynamic monitoring in normal pregnant subjects has confirmed the decrease in systemic vascular resistance that would be expected to accompany these changes. In addition there is a clearly demonstrated decrease in sensitivity to the pressor effects of angiotensin II during normal pregnancy.

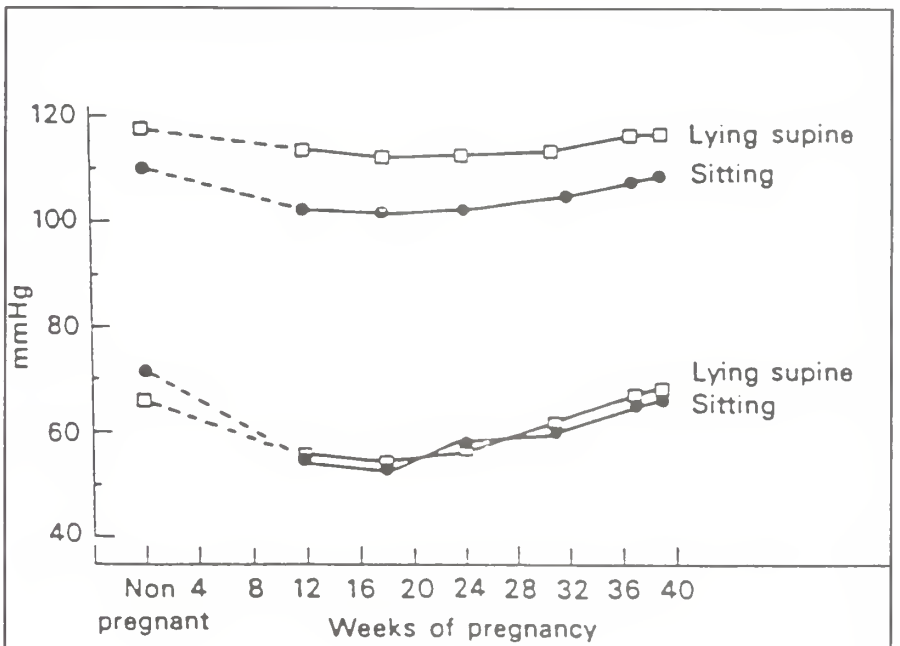


Fig 1.—Systolic (upper two lines) and diastolic (lower two lines) blood pressure trends during pregnancy in 226 health primigravidas. From Davey DA, MacGillibray I. The classification and definition of the hypertensive disorders of pregnancy. *Am J Obstet Gynecol.* 1988;158:892-898.

Epidemiologic studies that have examined blood pressure levels in relation to perinatal outcome also suggest that "normal" blood pressure during pregnancy may differ greatly from "normal" blood pressure in the general population. Friedman and Neff, in 1977, demonstrated a rise in fetal mortality when diastolic blood pressure exceeded 84 mm Hg at any time during gestation. In two additional large studies an increase in intrauterine growth retardation and perinatal mortality were found in the presence of mean arterial pressures of >90 mm Hg in the second trimester and >95 mm Hg in the third trimester. Therefore, it seems prudent to consider the upper limit of normal diastolic blood pressure to be 75 mm Hg in the second, and 85 mm Hg in the third trimester of pregnancy.

The importance of classifying hy-

***ABBREVIATIONS USED***
***BUN: blood urea nitrogen***
***CBC: complete blood count***
***FDA: Food and Drug Administration***
***HELLP: hemolysis, liver dysfunction and low platelets syndrome***
***NIH: National Institutes of Health***
***PT: prothrombin time***
***PTT: partial thromboplastin time***

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pertensive disorders in pregnancy lies in the fact that it is the etiology, not the degree of hypertension, that appears to have the greatest influence on perinatal outcome. Preeclampsia, which is perhaps the most difficult to identify, is the disorder associated with the greatest fetal and maternal risk. Chronic hypertension, unless it is associated with pheochromocytoma or significant renal disease, poses significantly less risk to the mother or fetus.

The classification scheme still used most frequently is that suggested by the Committee on Terminology of the American College of Obstetricians and Gynecologists in 1972 (Table 1). This classification was endorsed recently by the Working Group Report on High Blood Pressure in Pregnancy, published by the National High Blood Pressure Education Program at the National Institutes of Health. Women with hypertension during pregnancy are classified into four groups: (1) chronic hypertension; (2) preeclampsia-eclampsia; (3) chronic hypertension with superimposed preeclampsia; and (4) transient hypertension. We will focus on the first two groups in the classification.

Table 1. Classification of Hypertension in Pregnancy.

I. Disorder unique to pregnancy: preeclampsia-eclampsia
   Disease of 1st pregnancy, typically after 20 weeks gestation
   Characterized by hypertension plus proteinuria; edema not a reliable sign
II. Disorders unrelated to pregnancy: chronic hypertension of whatever etiology
   Pheochromocytoma, collagen vascular disease, and/or moderate to severe renal functional impairment present most serious risks
III. Preeclampsia-eclampsia superimposed on chronic hypertension
   Diagnosis frequently incorrect; should not be based solely upon increases in blood pressure; criteria should include new-onset marked proteinuria, rise in uric acid and/or fall in platelets
   Associated with substantially increased risk to mother and fetus
IV. Transient or late hypertension
   Increased blood pressure near term without other evidence of preeclampsia, resolves rapidly post-partum
   Recurrent transient hypertension may be harbinger of chronic hypertension

## Chronic Hypertension

Chronic hypertension is defined as sustained hypertension before or following pregnancy. The diagnosis depends on documentation of blood pressure elevation to >140/85 mm Hg prior to 20 weeks' gestation or for greater than 6 to 12 weeks postpartum. About 10% of the time an underlying cause is found, the most important being pheochromocytoma or renal disease. Pheochromocytoma is associated with a 50% maternal mortality if the diagnosis is not made prior to the onset of labor. Renal disease, when associated with hypertension or a serum creatinine of >1.5 ng/dl, is associated with a significant increase in perinatal morbidity and mortality.

The course of blood pressure during pregnancy in patients with chronic hypertension is variable. About 40% to 50% of patients will experience the normal second trimester fall in blood pressure. Those patients in whom the blood pressure fails to fall, or actually rises, have the greatest risk of severe exacerbation of hypertension and/or superimposed preeclampsia later in pregnancy. A failure to decrease sensitivity to, or an increase in sensitivity to the pressor effects of angiotensin II has also been demonstrated in these patients.

The effect of chronic hypertension on pregnancy depends on the severity of the hypertension and other associated conditions. Most of the time, chronic hypertension represents mild to moderate essential hypertension and has little effect on pregnancy outcome. The most serious maternal and fetal effects are seen in the presence of superimposed preeclampsia. Maternal effects include intracranial hemorrhage, deterioration of renal function, congestive heart failure and placental abruption. Fetal and neonatal effects include intrauterine growth retardation, prematurity, and an increased perinatal mortality.

The treatment of chronic hypertension during pregnancy is a subject of much debate. Drug treatment of mild hypertension has demonstrated no clear maternal or fetal benefit. Additionally, a normal mid-trimester fall in blood pressure is the most likely to occur in this group. We concur with the recommendation of the NIH working group that drug treatment be instituted in uncomplicated hypertensive patients when phase V diastolic blood pressure reaches 100 mm Hg. Treatment should be instituted at diastolic blood pressures of >90 mm Hg in patients with renal disease and/or diabetes mellitus to prevent further vascular and renal glomerular damage.

### *Pharmacologic Treatment of Hypertension*

Recommendations for choice of antihypertensives are variable and limited by the safety of a given drug to the developing fetus. The *central adrenergic inhibitors*, methyldopa and clonidine, have been well studied. The use of methyldopa as a single agent has been criticized on the basis of its limited efficacy in controlling hypertension and the frequency of its mild sedative effects, fatigue and dry mouth. However, at least one large study by Redman et al has demonstrated that the frequency of severe hypertension during pregnancy or in labor was decreased significantly by its use. Additional reports confirm that its efficacy and safety are at least equivalent to other antihypertensives, including beta-blockers. Birth weights, neonatal complications, progress in the first year of life and development to 7 years of age were equivalent in the methyldopa and control groups. Because data on the safety of this drug is so extensive, methyldopa continues to be many experts' first choice among antihypertensives. Sleep disturbance in offspring as well as decreased fetal breathing movements have been seen with the use of another central alpha-2-agonist, clonidine.

Of the *vasodilators*, hydralazine has been used the most extensively in pregnancy. It is chosen most frequently for hypertensive emergencies where it is administered by intravenous bolus or continuous infusion (see below). It appears to be reasonably safe for the

fetus, but can cause flushing, headaches, and tachycardia in the mother.

The *beta-adrenergic blockers* have now been extensively studied. Initial retrospective data and case reports associating maternal propranolol use with intrauterine growth retardation, neonatal respiratory depression, bradycardia, and hypoglycemia were alarming. However, more recent randomized prospective studies comparing atenolol, metoprolol, and oxprenolol with placebo and with other agents, including methyldopa, have failed to demonstrate adverse maternal or fetal effects, and have shown equivalent or improved fetal growth, blood pressure control, volume expansion, placental weight, and maternal compliance in the beta-blocker groups. A recent placebo-controlled trial examining atenolol use early in pregnancy, however, did demonstrate increased intrauterine growth retardation with its use throughout pregnancy. The safety and efficacy of labetalol, which combines beta-blockade with alpha-blockade, have been similarly demonstrated. Labetalol's vasodilatory effect, lack of bradycardia, and its rapid onset of action both orally and intravenously make it an ideal drug in this setting, and is our first choice of antihypertensive.

The *calcium channel blockers*, nifedipine, diltiazem, and verapamil are efficacious, but their safety remains unclear. Nifedipine has been associated with decreased placental perfusion and fetal acidosis in animal models, and a marked hypotensive effect in humans has been noted with its use in combination with magnesium sulfate.

***. . . in the majority of normal, pregnant women, blood pressure decreases during pregnancy, reaching a nadir at 16 to 20 weeks' gestation, and then gradually rising back to baseline at term.***

The *angiotensin converting enzyme inhibitors*, enalapril, captopril and lisinopril are contraindicated in pregnancy. Numerous reports of fetal and neonatal anuric renal failure and death have led to a reclassification of this drug by the FDA.

The use of *diuretics* should be limited to conditions characterized by maternal volume overload, since their use prevents normal maternal volume expansion during pregnancy and so, could have an adverse effect on placental perfusion.

### *Hypertensive Emergencies*

Hypertensive emergencies, whether from exacerbation of chronic hypertension or from severe preeclampsia (see below) are treated in a similar fashion. The goal of intravenous therapy should be to lower blood pressure rapidly and effectively, but in a manner so as to avoid hypotension and reflex sympathetic response, both of which may reduce placental blood flow. Hydralazine is the most frequently used drug in this setting. As a vasodilator it theoretically is a good choice in the presence of increased vascular resistance. However its prolonged (20 to 30 minute) onset of action, significant hypotension, flushing, headache, and reflex tachycardia limit its usefulness. Labetalol, also a vasodilator, has the advantage of a rapid onset of action without reflex tachycardia, and like hydralazine can be administered in small intravenous boluses or continuous infusion. In the presence of high cardiac output, a pure rapidly acting beta-blocker such as esmolol may be a better choice of drug. Nitroprusside has been associated with fetal thiocyanate toxicity and diazoxide with severe neonatal hypoglycemia. Consequently, neither drug is recommended antepartum.

## Preeclampsia/Eclampsia

Preeclampsia is defined as hypertension that presents after 20 weeks' gestation with proteinuria of >300 mg in 24 hours or >100 mg/dl in a random specimen. Eclampsia is characterized as seizures in the presence of preeclampsia.

Preeclampsia occurs in about 7% of pregnancies, primarily in primigravidas and most frequently near term. The maternal factors that predispose to preeclampsia include nulliparity, family history of preeclampsia, diabetes, chronic hypertension, antiphospholipid antibody syndrome, and extremes of age. Fetal risk factors include multiple gestation, hydrops fetalis, and hydatiform mole.

Preeclampsia is a multisystem disorder unique to pregnancy and difficult to diagnose since the presentation is extremely variable. This diagnosis is critically important to consider and make, however, since preeclampsia-eclampsia is associated with the greatest fetal and maternal morbidity and mortality.

***. . . the management and prognosis of chronic hypertension, which precedes pregnancy, differs greatly from that of preeclampsia, which is unique to pregnancy.***

The classic presentation is hypertension, proteinuria and edema with varying degrees of coagulation, and renal and hepatic abnormalities. The central pathogenic feature of preeclampsia is vasospasm, at times severe, which may lead to decreased perfusion of multiple organs including the uterus, placenta, kidney, brain and liver. There is increased activity of the coagulation cascade and increased platelet aggregation as well. Although hypertension and proteinuria are clinically useful signs in the diagnosis of this disorder, they are often late manifestations of a subclinical process that has been present since early in pregnancy. Preeclampsia may progress rapidly, at times without warning, to severe life threatening disease in the form of seizures, intracranial hemorrhage, liver rupture, pulmonary edema or disseminated intravascular coagulation.

The HELLP syndrome, a particularly severe form of preeclampsia, is characterized by hemolysis, liver dysfunction and low platelets. A high index of suspicion for preeclampsia in the presence of any one of its manifestations must be maintained since failure to recognize it can have serious consequences.

The laboratory evaluation should include CBC, urinalysis with protein

excretion, liver function tests, PT, PTT, serum uric acid, BUN, and creatinine. The most frequent findings include elevation of serum uric acid greater than 4.5 ng/dl (the upper limit of normal in pregnancy), thrombocytopenia, hemoconcentration and increases in serum creatinine and/or transaminases. More recently decreased levels of antithrombin III and decreased urinary calcium excretion have been found in patients with preeclampsia.

Attempts at prevention of preeclampsia have centered on the theory that its pathogenesis is related to an imbalance in arteriolar prostaglandin production, with the vasoconstrictive effect of thromboxane predominating over the vasodilatory effect of prostacyclin. Several investigators have observed that the administration of low-dose aspirin (60 to 100 mg/day) to pregnant patients with a variety of risk factors for preeclampsia will reduce the incidence of hypertension and improve fetal growth. The premise is that aspirin in small amounts will produce a greater inhibition of thromboxane than prostacyclin, altering the ratio in favor of vasodilatation. We currently use 80 mg of aspirin in pregnant patients with chronic hypertension and those with a prior history of preeclampsia, and in some patients with renal disease and or diabetes mellitus. Supplementation of dietary calcium has been shown to reduce the incidence of preeclampsia as well.

Treatment of preeclampsia should be in the inpatient setting almost exclusively because eclamptic seizures and life-threatening blood pressure elevations can occur with little or no warning. In general, if fetal lung maturity has been documented or preeclampsia occurs beyond 36 weeks' gestation, delivery is the treatment of choice after blood pressure is controlled and magnesium sulfate has been started for seizure prophylaxis. Delivery is also indicated regardless of gestational age in the presence of severe disease. Worrisome signs for which delivery should be considered include seizures, pulmonary edema, significant thrombocytopenia or other coagulation abnormality, uncontrolled, worsening or severe hypertension, visual disturbance, epigastric pain and worsening renal or liver function. In selected cases with mild disease or in whom the diagnosis is unclear conservative management with bedrest in the hospital may gain some time. However, since the disease will continue to progress unless the uterus is evacuated, ultimately delivery is the therapy of choice. Both preeclampsia and eclampsia can present postpartum, usually within the first 48 hours, and both have been reported to occur as late as 7 days following delivery.

In summary, the hypertensive disorders of pregnancy represent a broad spectrum of disease ranging from mild chronic hypertension to preeclampsia, which can be a severe multisystem life threatening condition. Careful diagnostic evaluation and early intervention should help prevent the high maternal and fetal morbidity associated with this disease.

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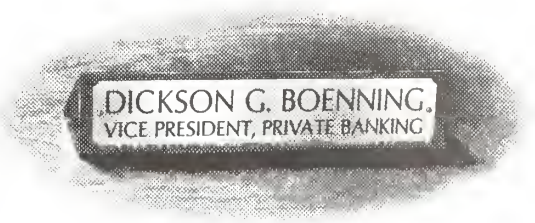


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# Hypertension in the Elderly

Charles E. McCoy, MD

***. . . randomized controlled trials have clearly demonstrated that treatment of hypertension in the elderly patient reduces cardiovascular morbidity.***

The increasing number of Americans over the age of 65 and the increased prevalence of hypertension in this population have made hypertension in the elderly an ever more important medical problem. Until recently, it was not known whether treatment of hypertension in the elderly patient had any impact on the increased rates of cardiovascular morbidity and mortality in these patients. Within the last 2 years, however, three large multi-center randomized controlled trials have demonstrated clearly that treatment of hypertension in the elderly patient reduces cardiovascular morbidity.[1]

## Epidemiology

Both systolic and diastolic pressures increase from infancy to approximately the fifth or sixth decade of life.[2] At this point the diastolic pressure begins to level off and even decreases in many individuals. Systolic pressure, however, continues to increase with advancing age.

It is well documented that cardiovascular morbidity and mortality increase with advancing age, due, in part, to increasing blood pressure. Although much of the clinical research on hypertension treatment has focused on the role of diastolic blood pressure, epidemiologic studies, particularly the Framingham Study, have shown convincingly that the systolic pressure is a better correlate of cardiovascular morbidity and mortality than the diastolic pressure.[3] The historical reliance on diastolic pressure may be related to its greater contribution to the mean arterial pressure. However, current evidence suggests that the injury caused by peak pressure (ie, systolic pressure) is a major determinant of end-organ damage.

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## Pathophysiology

Blood pressure is the product of cardiac output and peripheral vascular resistance. In most patients with established essential hypertension, elevated peripheral vascular resistance is responsible for the elevation in blood pressure. Typically, this hemodynamic abnormality is more severe in the elderly hypertensive patient than the younger hypertensive patient.[2]

Several mechanisms have been proposed for the elevated peripheral vascular resistance in hypertension. Most elderly patients have low plasma renin levels. This low renin is likely secondary to a sodium retentive state and a slight, if imperceptible, volume expansion with suppression of renin production by the kidneys. Sodium retention may result from genetic abnormalities in sodium transport and excretion or may be the result of aging of the human kidney. It has been hypothesized that this sodium retention and slight volume expansion result in production and release of a natriuretic factor from the hypothalamus that inhibits sodium-potassium-ATPase. In vascular smooth muscle cells, this inhibition would increase intracellular sodium and calcium concentrations, ultimately causing increased vascular smooth muscle tone. Another potential cause for increased peripheral vascular resistance in essential hypertension is insulin resistance, which may affect vascular tone by one of several postulated mechanisms. Finally, with aging there is hypertrophy of vascular smooth muscle endothelium and adventitia in the vascular wall resulting in decreased lumen diameter and increased resistance.[4]

Unlike young persons with hypertension, elderly patients tend to have a poorly compliant arterial vasculature. This is a consequence of vascular hypertrophy and atherosclerosis. Decreased compliance in and of itself does not increase peripheral vascular resistance or mean arterial pressure, but it does result in an increase in systolic pressure and a concomitant decrease in diastolic pressure.[4] Systolic blood pressure increases because non-compliant vessels lose their ability to buffer the rise in arterial pressure during systole. Diastolic pressure decreases because the vasculature fails to contract during diastole.

The combination of increased peripheral vascular resistance (which raises the systolic, diastolic, and mean pressure) coupled with non-compliant vessels (which tends to selectively increase systolic pressure, but reduce diastolic pressure) gives us the picture seen typically in the hypertensive elderly patient.

## Patient Evaluation

The evaluation of elderly patients with hypertension involves investigation of three specific areas:

1. Consider secondary causes of hypertension. While most elderly patients with hypertension have no identifiable underlying cause, the possibility of a secondary cause should be considered in all patients. The most common cause of secondary hypertension is renal parenchymal disease. This is identified easily with a urinalysis and serum creatinine level. Renal vascular disease should be considered, particularly in the patient who has a relatively recent onset of severe hypertension, unexplained renal insufficiency, asymmetrical kidneys seen on

***ABBREVIATIONS USED***
***ATPase: adenosine triphosphatase***
***BP: blood pressure***
***ECG: electrocardiogram***
***MRC: Medical Research Council***
***MRFIT: Multiple Risk Factor Intervention Trial***
***SHEP: Systolic Hypertension in the Elderly Program***
***STOP: Swedish Trial in Old Patients***

radiographic studies, extensive peripheral vascular disease, or abdominal or flank bruits. The Captopril Renal Scan is probably the best of the non-invasive studies for evaluation of renal vascular disease, but ultimately arteriography will be necessary for a few patients. Endocrine causes of hypertension in this population include primary hyperaldosteronism, which is characterized by hypokalemia, metabolic alkalosis and hypertension, and pheochromocytoma, which is usually accompanied by symptoms of palpitations, sweats, and weight loss. The hypertension accompanying pheochromocytoma is often paroxysmal. Plasma catecholamines or a 24-hour urine for metanephrines are effective screening tests. Hyperthyroidism should not be overlooked in this population, especially in the patient who has isolated systolic hypertension.

2. Patients should be evaluated for the presence of end-organ damage secondary to hypertension since these patients may warrant more aggressive therapy of their hypertension. A careful neurological examination should be done to exclude the presence of focal neurological defects secondary to stroke. The ECG or echocardiogram is beneficial to look for evidence of left ventricular hypertrophy. A urinalysis and creatinine are effective screening tests in determining the presence of hypertensive renal disease.

***Systolic blood pressure increases because non-compliant vessels lose their ability to buffer the rise in arterial pressure during systole.***

3. Patients should be screened for their overall risk for cardiovascular disease by evaluating their glucose, cholesterol level, smoking history, exercise history, family history and weight. The presence of multiple risk factors dramatically increases the risk of cardiovascular disease. The Framingham study, has shown a more than additive effect of smoking, hypercholesteremia and diabetes to the cardiovascular risk in patients with hypertension.

The overall evaluation of an elderly patient with hypertension should include a thorough history and physical examination. The laboratory testing should include at a minimum a serum potassium, creatinine, cholesterol, glucose, and urinalysis and ECG.

Table 1.—Results of the Three Most Recent Hypertension Treatment Trials in the Elderly.

| | SHEP | STOP-Hypertension | MRC |
|---|---|---|---|
| No. Patients | 4736 | 1627 | 4396 |
| Age Range, yrs | >60 | 70-84 | 65-74 |
| BP Entry Criteria, mm Hg | | | |
| Systolic | 160-219 | 180-230 <180 or | 160-204 |
| Diastolic | <90 | 90-120 105-120 | <115 |
| Initial BP, mm Hg | 170/77 | 195/102 | 185/91 |
| Treatment BP, mm Hg | | | |
| Treatment | 144/68 | 167/87 | 152/79 |
| Placebo | 155/71 | 186/96 | 167/85 |
| Events, % change | | | |
| Stroke | -36* | -47* | -25* |
| Cardiac | -27* | -13* | -19* |
| All Cardiovascular | -32* | -40* | -17* |
| Total Mortality, % change | -13 | -43* | - 3 |

* $p < 0.05$

Adapted from Beard K, Bulpitt C, Mascie-Taylor H, et al. Management of elderly patients with sustained hypertension. *Br Med J.* 1992;304:412-416.

## Treatment

A review by Beard et al summarizes the six most important randomized, double-blind, controlled trials of the treatment of hypertension in the elderly.[2] Three of these trials were conducted in the late '70s and early '80's. A subset analysis of patients ages 60 to 69 in the Australian trial of patients with mild to moderate hypertension revealed that these patients treated with a chorthalidone-based regime had a reduction in stroke, cardiac disease, and overall cardiovascular disease. The European Working Party on High Blood Pressure in the Elderly Trial randomized 840 patients aged 60 to 97 with systolic and diastolic hypertension. This was a controlled trial and the treatment group received a hydrochlorothiazide and triamterene based regimen with methyldopa added as a second-line medication. These patients had significant reductions in stroke and all cardiovascular disease compared to controls. The third trial was that of Coope and Warrender, a randomized trial of treatment of hypertension in elderly patients in a primary care setting in Great Britain. Again, patients had both systolic and diastolic hypertension and were randomized to a regimen based on atenolol, with a thiazide diuretic added as a second-line therapy. These patients had significant reductions in stroke and all cardiovascular events.

These three trials suggest that treating systolic and diastolic hypertension in elderly patients did reduce stroke and cardiovascular mortality. By the mid-1980s three larger trials had been planned and initiated, and the results of these trials were only recently published (Table 1).

The STOP Hypertension Trial (The Swedish Trial in Old Patients with Hypertension)[6] included 1627 patients aged 70 to 84 with systolic and diastolic hypertension. They received either a hydrochlorothiazide and amiloride based regimen or placebos. The total study duration was 65 months and the average time in the study was 25 months. The mean difference in blood pressure between placebo-treated patients and active medicine-treated patients was 19.5/8.1 mm Hg. Patients were noted to have a significant reduction in strokes, both fatal and non-fatal, as well as a significant reduction in all cardiovascular events and total mortality. This study is particularly important because of the demonstration of a significant reduction in overall mortality. None of the studies in the elderly, including this study, have been

designed in a way to examine total mortality, but each of the studies mentioned here has shown a tendency toward reduction in mortality (Table 1).

The British Medical Research Council (MRC) trial on hypertension in older adults studied more than 4000 patients aged 65 to 74 who were randomized to receive hydrochlorothiazide plus amiloride or atenolol or placebo.[7] All patients at entry had a systolic pressure between 160 and 209 mm Hg with diastolic pressure of less than 115 mm Hg. The average entrance blood pressure was 185/91 mm Hg. Combining the treatment groups and comparing with placebo, there were significant reductions in strokes and total cardiovascular events, but the reduction in coronary events did not reach statistical significance. Analysis of the two treatment groups demonstrated that the diuretic-treated patients had significant reductions in stroke, coronary events, and all cardiovascular events when compared to placebo. The beta-blocker treated group had no significant reductions in any of the cardiovascular end-points when compared to placebo, despite a blood pressure response similar to that observed with diuretics.

The final study was the Systolic Hypertension in the Elderly Program (SHEP).[8] This was a multi-center randomized study in the United States of patients with systolic hypertension and normal diastolic blood pressures. There were 4736 patients randomized to either placebo or chlorthalidone treatment. Patients were started on 12.5 mg of chlorthalidone and increased to 25 mg if blood pressure reduction was not optimal, and atenolol was added as a second agent. Average entry blood pressures were 170/77 mm Hg. A significant reduction in stroke and all cardiovascular events was again noted. The SHEP study demonstrated that treatment of isolated systolic hypertension reduces stroke and cardiovascular events and is the only randomized study available addressing this specific issue.

These trials clearly demonstrated that modest blood pressure reductions in elderly patients reduced cardiovascular morbidity (and, in one trial, mortality) and that this reduction in the cardiovascular events is also seen in patients with isolated systolic hypertension. These results are especially impressive considering the follow-up duration was relatively short, and the blood pressure reductions are relatively small.

All of these studies were conceived more than a decade ago resulting in treatment regimes that are based on thiazide diuretics. In contrast to earlier cardiovascular risk trials such as the MRFIT Study, there were no significant adverse effects seen as a result of diuretic therapy. While many of these studies demonstrated significant reductions in potassium, there were few patients who had frank hypokalemia, ie, serum potassium < 3.5 mEq/L. Potassium levels were followed closely and potassium supplementation given to those patients with hypokalemia. The relatively low doses of thiazides, ie, 12.5 mg/day of hydrochlorothiazide or chlorthalidone, resulted in significant reductions in blood pressure with minimal metabolic side effects.

Other classes of medications have been proven to be effective in reducing blood pressure in elderly patients. With the data currently available, it


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would be reasonable to use as a first line agent a diuretic, beta-blocker, calcium-antagonist, converting enzyme inhibitor, or alpha-antagonist in an elderly patient with hypertension. However, only diuretics and beta-blockers have shown a reduction in cardiovascular end-points in controlled trials.

It is important not to overlook the role of non-pharmacological treatment in these patients. Of particular importance are weight reduction, exercise, and salt restriction. In addition, one has to treat other risk factors for cardiovascular disease including diabetes, hypercholesterolemia, and smoking.

## Summary

Hypertension and its cardiovascular consequences are growing medical problems in the elderly. Hypertension in older patients is characterized not only by an increase in peripheral vascular resistance, but also by a reduction in arterial compliance. These abnormalities result in marked rises in systolic pressures and variable diastolic pressures that range from markedly elevated to low-normal. Several large placebo-controlled trials have recently demonstrated that treating hypertension in elderly patients reduces cardiovascular disease. This is true in patients with systolic and diastolic hypertension as well as patients with isolated systolic hypertension. Although reduction of cardiovascular end points has only been demonstrated for thiazide diuretics and beta-blockers, it may be reasonable to include other classes of medications in the initial treatment of some elderly hypertension patients.

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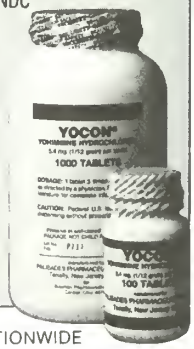


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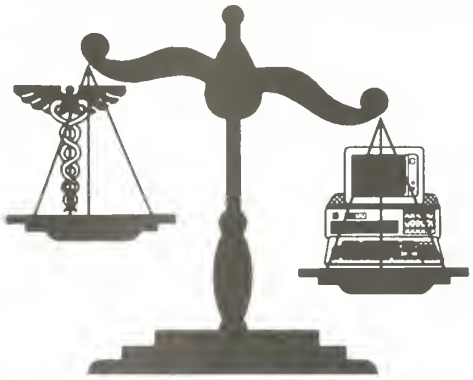

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# Hypertension and Left Ventricular Hypertrophy: What Is the Link?

Ansermo Arthur, MD
Candace M. McNulty, MD, FACC

***Organ damage is directly related to the duration and magnitude of systemic blood pressure.***

Approximately 63 million Americans have systemic arterial hypertension, one of the most common medical conditions in this country.[1] Hypertension is a strong risk factor for coronary artery disease, left ventricular (LV) hypertrophy, stroke, congestive heart failure, peripheral vascular disease and renal failure.[1] Organ damage is directly related to the duration and magnitude of systemic blood pressure. Although treatment of even mild hypertension (diastolic blood pressure 90 to 100 mm Hg) reduces cardiovascular morbidity and mortality,[1,2] 67% of Americans with hypertension do not take medication or alter their diet, and another 50% are unaware of its presence.[1]

One of the earliest cardiac adaptations to hypertension is an increase in LV muscle mass. There is a direct correlation between the degree of blood pressure elevation and myocardial mass.[4] The risk of myocardial infarction, congestive heart failure, and sudden cardiac death increases dramatically in patients with hypertension and LV hypertrophy.[5,6] Other causes of hypertrophy such as obesity, diabetes mellitus and increased age are common in patients with hypertension and potentiate its effect on LV mass.[7] These additional factors that affect LV mass may explain the failure of hypertrophy to regress in patients effectively treated with some forms of antihypertensive medications.[7] As treatment prevents cardiovascular complications and hypertrophy, it is important to identify persons with consistently elevated blood pressures. The clinician should have a thorough understanding of the pathophysiology and consequences of hypertrophy in patients with coexisting hypertension.

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## Pathophysiology and Consequences of LV Hypertrophy

The development of LV hypertrophy is an early cardiac adaptation to an increased hemodynamic burden. The nature of the load stimulates one of two types of hypertrophy: concentric or eccentric. The process is extremely complex and involves the myocyte, the myocardial interstitium, and energy supply and demand. Blood pressure elevation increases myocardial wall stress; this stimulates enlargement of myocytes and parallel replication of myofibrils resulting in an increase in LV mass.[7] Pressure overload states such as hypertension, aortic stenosis, or coarctation of the aorta cause concentric hypertrophy. It is characterized by an increase in ventricular wall thickness without cavity dilatation (Figure 1A,B).

In contrast, volume overload states such as aortic regurgitation, obesity, and ventricular septal defect lead to eccentric hypertrophy. It is characterized by predominant cavity dilatation but a proportionately smaller increase in wall thickness (Figure 2). The energy requirement of the hypertrophied ventricle is greater than the normal ventricle, and the capacity of the coronary vascular bed to grow is limited.[8] This results in an imbalance between vascular supply and energy requirements.[8] Myocardial ischemia may occur even though the coronary arteries are patent. Chronic untreated hypertension is also a principal cause of coronary artery atherosclerosis. Thus, hypertension and LV hypertrophy both serve to increase the risk of myocardial infarction and angina pectoris.

Alterations in connective tissue and the interstitium play an important role in the hypertrophied ventricle. The amount of collagen surrounding individual myocytes increases and preserves the force generating capacity of the ventricle.[9] The excess collagen also results in increased ventricular stiffness; decreased compliance and changes in diastolic filling characteristics are among the earliest hemodynamic changes to occur.[9] Early diastolic filling is reduced, leading to a compensatory increase in late filling.[10] The resulting diastolic dysfunction interferes with ventricular filling and may cause congestive heart failure. Congestive heart failure due to systolic dysfunction, unlike diastolic dysfunction, is a manifestation of a depressed cardiac contractile state leading to a low cardiac output, and failure of the ventricle to empty adequately.[11] Up to a third of patients presenting with congestive heart failure due to diastolic dysfunction may have normal radionuclide ejection fractions and may be indistinguishable clinically from patients with systolic dysfunction (Table 2).[11]

Further deposition of collagen may occur during myocardial ischemia, and increased levels of angiotensin II may play a role.[9] Eventually the fibrotic hypertrophied ventricle is unable to sustain the increased afterload of hypertension. At that point, ventricular dilation and systolic failure ensue. Eccentric hypertrophy may then predominate. Congestive heart failure due to systolic dysfunction is a common end-stage complication in patients with chronic untreated hypertension.

Hypertensive LV hypertrophy is a harbinger for ventricular arrhythmias and sudden death. The incidence of sudden cardiac death is fourfold higher in patients with LV hypertrophy.[12] Sudden death is probably due to ventricular tachyarrhythmias, as ectopy is

***ABBREVIATIONS USED***
***LV: Left ventricular***
***LVH: Left ventricular hypertrophy***

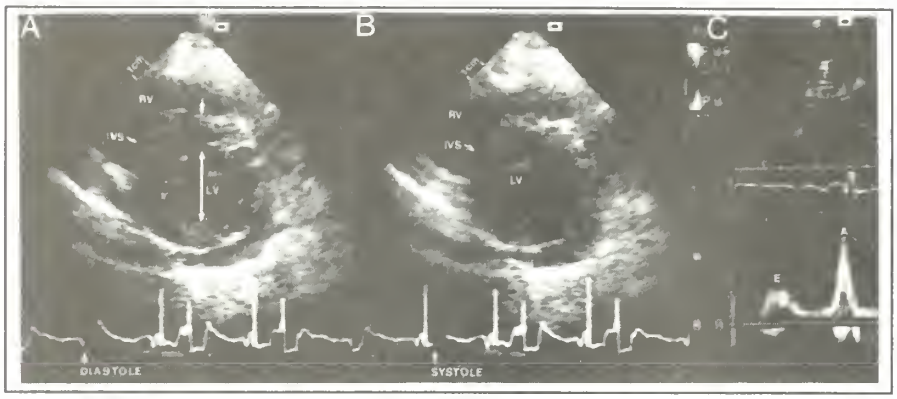


Figure 1 A, B, C: Panels A and B are still frames of a transthoracic two-dimensional echocardiogram of a patient with concentric left ventricular hypertrophy due to hypertension. Both are short axis views of the left ventricle at the level of the mitral valve. Panel A shows a very small left ventricular cavity size (long double-headed arrow) and increased thickness of the left ventricular wall (small arrows) during diastole. Panel B shows a further increase in wall thickness (small arrows) and further reduction of (long double-headed arrow) the cavity of the left ventricle during systole. Panel C shows a pulse wave Doppler spectral tracing of transmitral blood flow during diastole from the same patient. The peak E velocity is much less than the peak A velocity due to diastolic dysfunction from concentric hypertrophy. RV = right ventricle; LV = left ventricle; IVS = ventricular hypertrophy.

more frequent among hypertensive individuals.[13] A variety of factors increase the frequency of ectopy; among these are myocardial ischemia and fibrosis.[5] Ectopy may also result from electrolyte abnormalities due to diuretic therapy. Therefore, patients treated with diuretics should also have frequent monitoring of serum potassium and magnesium levels.

## Prevalence and Diagnosis of LV Hypertrophy

The diagnosis of LV hypertrophy can be made by either two dimensional echocardiography or electrocardiography. Echocardiography is often used because of the strong correlation with post-mortem studies.[14] Electrocardiography has a high specificity (95%) but is not as reliable because of a low sensitivity (20%).[15] The prevalence of LV hypertrophy was 16% in men and 19% in women in the Framingham study by echocardiography.[16] Only 3% of the group had hypertrophy if electrocardiography was used.[16] Regardless of the diagnostic method, the presence of hypertrophy portends a worse prognosis for adverse cardiovascular events.[13,17,18]

In spite of this, two-dimensional echocardiography is not recommended in the routine assessment of individual patients unless certain clinical findings are present.[5] These include patients with evidence of organ damage such as hypertensive retinopathy, an atrial (S4) gallop, or LV hypertrophy on cardiac palpation. Echocardiography should be performed in patients at risk for hypertrophy such as the elderly, the obese, or black persons. Another indication is congestive heart failure. A cardiac Doppler study should be added in these patients as it may show additional evidence of diastolic dysfunction. This is suggested if the pulse wave Doppler tracing of transmitral blood flow shows a characteristic contour (Figure 1C). The peak velocity of early transmitral flow (E point) is reduced while that of late flow (A point) is increased.[10] Unfortunately, this easily measured Doppler index is not specific for diastolic dysfunction. It may also occur in tachycardia, volume depleted states, and increasing age, and be masked by atrial fibrillation and mitral regurgitation.[10]

## LV Hypertrophy Therapeutic Concepts in Hypertension

Effective control of the blood pressure will cause a reduction in hypertrophy in most cases (see Table 1). A comprehensive review is beyond the scope of this article but certain therapeutic concepts deserve mention. Animal studies reveal that sustained treatment of elevated blood pressure leads to improvement in ventricular function.[20] Recently, several investigators demonstrated reversal of left ventricular hypertrophy in patients treated with various antihypertensive medications.[21] It is not known if reversing hypertrophy in humans will improve long-term survival or attenuate the

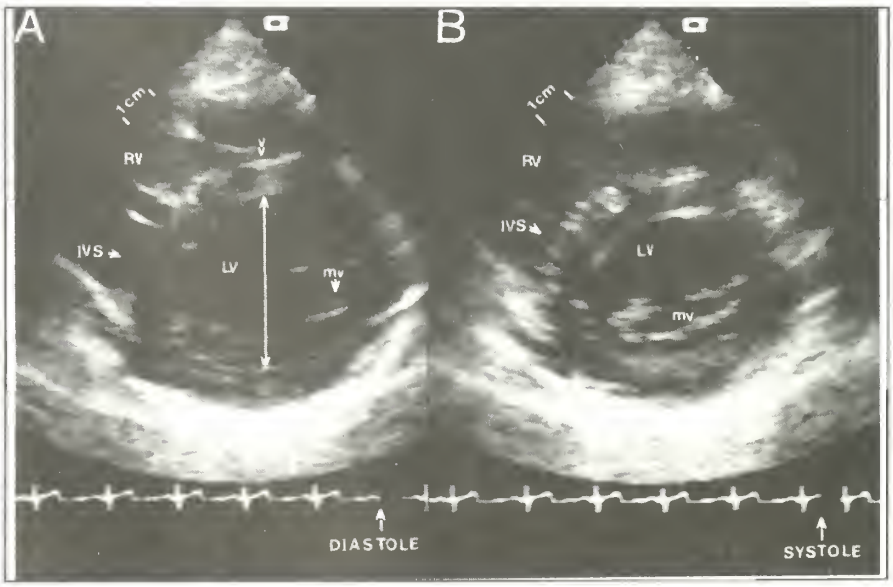


Fig 2.—Panels A and B are still frames of a transthoracic two-dimensional echocardiogram of a patient with eccentric left ventricular hypertrophy due to severe aortic regurgitation. Both are short axis views of the left ventricle at the level of the mitral valve. Panel A shows enlargement of the left ventricular chamber (long double-headed arrow) during diastole and a relatively normal wall thickness. Panel B shows a marked reduction in left ventricular cavity size secondary to hyperdynamic wall motion due to aortic regurgitation. RV = right ventricle; LV = left ventricle; IVS = ventricular septum.

Table 1.—The effect of anti-hypertensive agents on hypertrophy and potential adverse effects.[19]

| Drugs | Regression | Potential Adverse Effects |
|---|---|---|
| Beta Receptor Blocking Agents | YES | Bronchospasm, hypoglycemia, conduction disturbances, increased lipid levels, ? decreased HDL, heart failure |
| Angiotensin Converting Enzyme Inhibitor Agents | YES | Renal insufficiency, leukopenia, cough, anaphylaxis, angioedema |
| Calcium Channel Blocking Agents | YES* | Conduction disturbances, heart failure, edema |
| Alpha Receptor Blocking Agents (Prazosin) | YES | Orthostatic hypotension |
| Diuretic Agents (Furosemide, Thiazides) | Not confirmed by all studies with short-term use. Long-term treatment may reduce LVH. | Hypokalemia, hypomagnesemia, glucose intolerance, increased lipid levels, increased uric acid level, ? arrhythmogenesis. |
| Vasodilator Agents (Hydralazine, Minoxidil) | NO** | Edema, orthostatic hypertension |

LVH = left ventricular hypertrophy
* = except for Nifedipine
** = may worsen LVH

adverse independent risks associated with its presence. It is also not known why short-term use of certain antihypertensive agents is less effective in causing regression of LV hypertrophy than others. There is speculation that agents that lower blood pressure but do not reduce the outflow of the sympathetic nervous system or blunt the cardiac response to increased sympathetic tone will not reduce LV hypertrophy.[19] Examples include diuretic and vasodilator agents that effectively lower blood pressure but induce a reflex tachycardia. There is evidence suggesting that non-pharmacologic therapy may be more effective than medical therapy in lowering blood pressure and causing regression of LVH in certain patient groups.[22] The fifth report of the Joint Committee on High Blood Pressure (1992) recommended nonpharmacologic measures as important adjuncts to medical therapy and as the first approach to individuals with hypertension.[3] For this reason, the importance of lifestyle changes such as weight loss, salt restriction, abstinence from alcohol, aerobic exercise, and reduction of dietary fat cannot be overemphasized.

## Conclusion

Systemic hypertension is an important cause of LV hypertrophy. Myocardial hypertrophy is an adaptive response to an abnormal cardiac load and serves to lower myocardial wall stress. If the precipitating load is not removed, hypertrophy continues and ultimately produces abnormalities in cardiac performance. Initially, there is diastolic dysfunction followed eventually by systolic failure. Left ventricular hypertrophy is a marker for increased risk of congestive heart failure, myocardial ischemia, sudden death and cardiovascular mortality. Although it is not known if reversing hypertrophy will improve survival, it is important to identify patients with systemic hypertension and aggressively treat these individuals before LV hypertrophy supervenes. Echocardiography provides the most sensitive and specific technique for evaluating changes in cardiac dimensions.

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Table 2.—Clinical and Hemodynamic Characteristics of Systolic and Diastolic Heart Failure

| Features | Systolic Heart Failure | Diastolic Heart Failure |
|---|---|---|
| S3 gallop | Usually present | Infrequently present |
| S4 gallop | Usually present | Present |
| Crackles on auscultation | Present | Present |
| Chest X-ray | Pulmonary venous congestion | Pulmonary venous congestion |
| Ejection fraction | Low | Normal or Supranormal |
| LV end diastolic pressure | Usually elevated when patient symptomatic, but may normalize with treatment | Always elevated |
| LV End Diastolic volume | Increased | Normal or low |
| Intravascular volume | Increased | Normal |
| Response to diuretics | Prompt improvement | Prompt improvement if pulmonary edema is present. |

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# Liquorice: New Insights into Mineralocorticoid and Glucocorticoid Hypertension

David J. Morris, DPhil

***Ingestion of liquorice has long been associated with Na+ retention, K+ loss, supression of the renin-angiotensin-aldosterone axis, and more recently, increased urinary excretion of free cortisol.***

Clinicians have available to them a wide variety of medications for the treatment of hypertension and its attendant complications. Remarkable advances in cardiovascular research and the subsequent development of new anti-hypertensive drugs such as calcium channel blockers and converting enzyme inhibitors have taken place. Nevertheless, the etiology of the elevated blood pressure in the majority of patients still remains unknown, and the patients fall into the category of essential hypertension.

In the past several years many significant developments in the understanding of the biochemistry and pathophysiology of hypertension and the cardiovascular system have occurred. The discovery of the atrial natriuretic factors, the vasoconstrictive peptide endothelins and their specific receptors, the endothelium derived relaxing factor (EDRF) - nitric oxide system, and a better understanding of $Na^+$ and $K^+$ channel biochemistry represent major research breakthroughs. This article will focus on the new insights that have served to increase our understanding of the mechanisms by which adrenal mineralocorticoids and glucocorticoids may cause $Na^+$ retention and hypertension. These insights have been gained principally from biochemical observations following liquorice ingestion, which has been known for several decades to cause hypertension in certain individuals.

The typical renal effects of the endogenous mineralocorticoids, aldosterone and deoxycorticosterone, are to stimulate both $Na^+$ retention and $K^+$ secretion. Endogenous glucocorticoids, such as cortisol and corticosterone, rarely cause $Na^+$ retention, but do lead to $K^+$ secretion. However, under certain clinical conditions, endogenous glucocorticoids *can indeed* cause $Na^+$ retention, a finding that has stimulated intensive research in this field. The mechanisms by which glucocorticoids express mineralocorticoid-like activity represent a unique physiological phenomenon, and will help in the understanding of how glucocorticoids may ultimately lead to elevated blood pressure in essential hypertension and other forms of glucocorticoid-dependent hypertension.

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## Liquorice and Hypertension

The root of the liquorice plant *G. glabra* has been used through the millennia for a variety of medicinal purposes. It was used by the Greeks and far earlier by the Chinese. During the middle ages, herbalists described its use in recipes for "the cure of internal sores and ulcers."[1] It was this fact that prompted the synthesis of carbenoxolone sodium (CBX), a soluble (succinate) form of the active triterpene principle of the liquorice root, glycyrrhetinic acid (GA) (Figure 1), for use as an anti-ulcer agent worldwide. The effects of liquorice on electrolyte hemeostasis and blood pressure ($Na^+$ retention, hypokalemia and hypertension) were already known, and it was these side effects that led to prohibition of the use of CBX in the United States.

## Apparent Mineralocorticoid Excess Syndrome

Over the past decade we have learned that target tissues, eg, the kidney, as well as non-target tissues, eg, the liver, metabolize both glucocorticoids and mineralocorticoids. Emphasis on the importance of the "inactivating" pathways of glucocorticoid and mineralocorticoid metabolism has re-emerged from the work of Ulick and New et al.[2,3] These investigators discovered major changes in the metabolism of the major glucocorticoid, cortisol, in children with the syndrome of Apparent Mineralocorticoid Excess (AME). This syndrome is associated with $Na^+$ retention, $K^+$ wasting and hypertension, while plasma aldosterone and renin levels remain low.[2,3] These researchers clearly showed that children with AME lack the enzyme 11β-hydroxysteroid dehydrogenase (11β-OHSD). This enzyme, present principally in the liver and kidney in normal persons, metabolizes cortisol to its putative inactive product, cortisone. Cortisone appears to be effective clinically only after enzymatic reduction to cortisol in the liver. The researchers also showed that children with AME showed diminished hepatic steroid 5β-reductase activity. This enzyme catalyses the formation of 5β-dihydro derivatives of aldosterone and cortisol — the initial step in the formation of their inactive tetrahydro- derivatives (Figure 2).

The clinical features of hypertension and hypokalemia, and the alter-

***ABBREVIATIONS USED***

***AME: apparent mineralocorticoid excess***
***CBX: carbenoxolone sodium***
***EDRF: endothelium-derived relaxing factor***
***GA: glycyrrhetinic acid***
***GALF: glycyrrhetinic acid-like factors***
***OHSD: hydroxysteroid dehydrogenase***

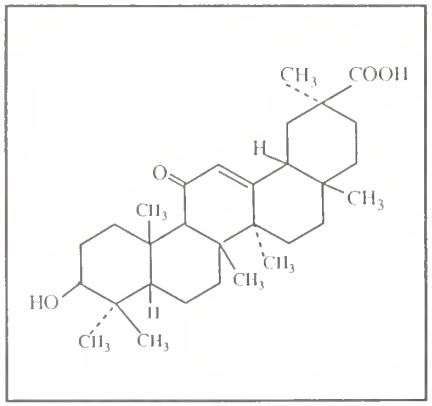


Fig 1.—Glycyrrhetinic Acid (GA)

ations in the pathways of glucocorticoid metabolism that are found in AME patients are also observed in individuals who ingest liquorice.[4] Ingestion of liquorice has long been associated with $Na^+$ retention, $K^+$ loss, suppression of the renin-angiotensin-aldosterone axis, and more recently, increased urinary excretion of free cortisol. These pathfinding studies not only indicated that patients ingesting liquorice closely mimicked the clinical features of patients with AME, but also that the principal active ingredients in liquorice, glycosides of GA, most likely caused the observed changes in metabolism of cortisol.

Taken together with recent studies that have shown that conversion of cortisol to cortisone is markedly inhibited by both GA and CBX, these findings led to the hypothesis that 11β-OHSD must be a key to the anomalous $Na^+$ retention caused by glucocorticoids. In AME syndrome or following liquorice ingestion, deficient 11β-OHSD activity allows the relatively high peripheral and intrarenal concentrations of cortisol to interact with renal mineralocorticoid receptors to promote $Na^+$ reabsorption. This hypothesis was further refined by Edwards et al[5] and Funder et al[6], who concluded that 11β-OHSD acted as a protective mechanism or "gatekeeper enzyme" which, under normal conditions, prevented glucocorticoids from activating mineralocorticoid receptors. The realization that "protective" mechanisms may exist which can prevent inappropriate activation of receptor-induced activity represents, I believe, a milestone in our understanding of the mechanisms of action of adrenal steroid hormones in their target tissues.

## Evidence Supporting Role of 11β-OHSD

Several experiments using both the *in vivo* rat bioassay and the isolated toad bladder preparation have been reported which lend support to the hypothesis that the enzyme 11β-OHSD, in mineralocorticoid-target tissues, acts as a "protective" mechanism which prevents endogenous glucocorticoids from causing mineralocorticoid receptor-mediated effects on $Na^+$. Initial experiments using adrenalectomized rats demonstrated that the glucocorticoids, cortisol and corticosterone, when administered alone do not elicit $Na^+$ retention (as do mineralocorticoids), but do promote $K^+$ secretion. In rats treated with CBX, however, both cortisol and corticosterone cause potent $Na^+$ retention and enhanced potassium-wasting.[7]

These experiments confirmed earlier reports that liquorice ingestion was associated with enhanced $Na^+$ retention and that an intact adrenal gland was necessary for this process to occur. A significant proportion of the antinatriuretic response in adrenalactomized rats conferred on corticosterone by CBX, and the amplified kaliuresis, were inhibited by spironolactone and the specific mineralocorticoid antagonist, RU28318, indicating that these effects are mediated by occupation of renal mineralocorticoid receptors.[8]

Experiments with the isolated toad bladder (also a mineralocorticoid target tissue) then showed that the active $Na^+$ transport elicited by cortisol and corticosterone could be enhanced by addition of CBX to the incubation medium. 11β-OHSD activity present in this tissue was then shown to be diminished by the addition of CBX.[9]

## Involvement of Other Mechanisms

Despite the attractiveness of the "guardian" hypothesis, not all experiments conform to the initial theory. The antinatriuretic effects of low dosages of the mineralocorticoids, aldosterone and deoxycorticosterone, were amplified in CBX-treated adrenalectomized rats; however, the kaliuretic properties of these two mineralocorticoids remained unaffected. Thus, CBX seems to amplify or enhance the already existing $Na^+$ retaining activities of mineralocorticoids; a process which has also been shown to be mediated via mineralocorticoid receptors.[8] Since neither aldosterone nor deoxycorticosterone can serve as substrates for the enzyme 11β-OHSD, other additional mechanisms must be proposed.

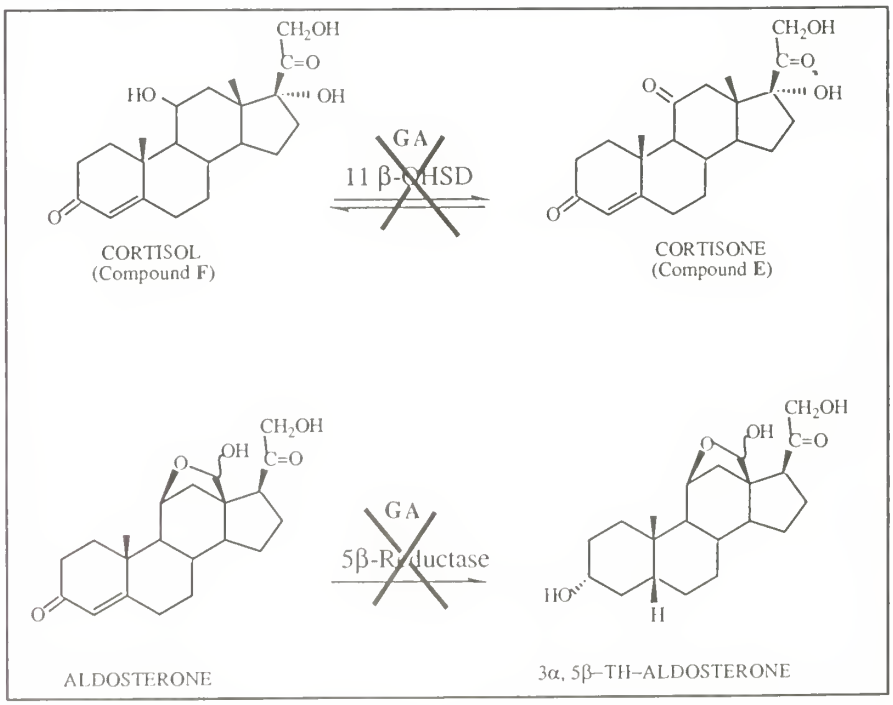


Fig 2.—Inhibition of inactivation pathways by GA

Other somewhat surprising findings were recently obtained when we examined *in vivo*, the effects of 11-dehydro-corticosterone (the 11β-OHSD product of corticosterone) on $Na^+$ and $K^+$ excretion in the kidney. Dosages of 11-dehydro-corticosterone, which alone were inactive, caused marked $Na^+$ retention in CBX treated rats. Under these conditions 11-dehydro-corticosterone was significantly more potent (5-10 times) than corticosterone, its parent steroid. One possible explanation for this finding is that CBX inhibits the conversion of corticosterone to 11-dehydro-corticosterone, but not that of 11-dehydro-corticosterone back to corticosterone, and/or the renal biovailability of hepatically synthesized corticosterone (from 11-dehydro-corticosterone) may be greater than that of corticosterone administered exogenously.

## Other Actions of Liquorice-Like Compounds

Aside from 11β-OHSD, CBX and GA have both been shown to inhibit at least two other important steroid inactivating enzymes, 5β-reductase and 3β-HSD.[10] These steroid-inactivating enzymes known to be inhibited by CBX are found in the liver, thereby making it possible for these enzyme-hormone interactions also to alter the peripheral and intrarenal levels of circulating glucocorticoids and mineralocorticoids. Thus, "activation" and "inactivation" pathways of adrenal steroid hormone metabolism in both the liver and kidney may be linked in some way to the regulation of their individual mechanisms of action in target tissues.

For instance, CBX and GA markedly inhibit the 5β-Ring A reduction of aldosterone and cortisol, but have no effect on 5α-reductase.[10] Thus GA and liquorice not only affect the "inactivation" of glucocorticoids to their 11-keto products, but they also channel the metabolism of glucocorticoids, aldosterone and other adrenocorticoids into the 5a-reduced pathways. Compounds in the 5α-reduced pathway have been shown to possess antinatriuretic activity and may also be synthesized locally in both target tissues, kidney and toad bladder.[8] Further studies must include the effects of CBX and GA on the hepatic and renal metabolic transformations of all these steroid hormones. Their effects on each of the "protective" mechanisms might be intricately related to alterations of the metabolism of these steroid hormones and/or their metabolic fate.

## Endogenous Liquorice (GA - Like Factors: GALFs)

The importance of 11β-OHSD and 5β-reductase in $Na^+$ homeostasis and hypertension led us to investigate whether endogenous substance(s) exist in humans which might inhibit either of these two enzymes and hence play a regulatory role in the control of electrolyte balance and blood pressure. In our initial experiments we have been able to show that urines from both males and females do indeed contain measurable levels of substance(s) which inhibit both 11β-OHSD and 5β-reductase.[11] Since these substances mimic the effects of GA, we have named the inhibitory substances found in urine Glycyrrhetinic Acid-Like Factors , abbreviated as GALFs or, more specifically 11β-GALF for substances active against 11β-OHSD, and 5β-GALF for those that possess inhibitory activity to 5β-reductase. We also found that the levels of both types of GALFs increased markedly with advancing pregnancy, a condition in which there are marked changes in $Na^+$ homeostasis and water balance.

Preliminary data have now suggested that these endogenous GALF factors may be produced in excess by patients with essential hypertension. The altered cortisol metabolism caused


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by these substances may amplify mineralocorticoid-receptor sensitivity to cortisol (and perhaps also to aldosterone and deoxycorticosterone), thereby contributing to the elevation of blood pressure in these patients.

## Conclusions

The data accumulated so far are consistent with the following:

1. In normal humans, renal 11β-OHSD acts as a guardian enzyme to confer specificity to the mineralocorticoid receptor; it prevents endogenous cortisol from triggering mineralocorticoid receptor-mediated $Na^+$ retention.
2. The syndrome of AME, manifested by the hyperaldosterone-like findings of hypernatremia, hypokalemia, and hypertension, is actually accompanied by suppressed aldosterone levels, and is due to a deficiency of 11β-OHSD. Ingestion of CBX or GA in large amounts inhibits 11β-OHSD and causes similar clinical manifestations.
3. A second distinct "protective" mechanism for the mineralocorticoid receptor may exist independently of 11β-OHSD. This mechanism may involve alternate metabolic pathways for mineralocorticoids which limit endogenous mineralocorticoids from eliciting excessive, inappropriate mineralocorticoid receptor-mediated Na+ retention.
4. The inhibitory effects of GA and CBX on the 5β-reductase degradation pathway of both glucocorticoids and mineralocorticoids may result in enhanced production of steroid metabolites with $Na^+$ retaining activity.
5. The overall renal response to glucocorticoids and mineralocorticoids under any given circumstance is complex and may represent the summation of the effects of each of these steroid hormones, as modulated by the 11β-OHSD and 5β-reductase enzymes, in the liver and in various segments of the kidney.

## Acknowledgements

This work was supported by the NIH Grant DK-21404.

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# Antihypertensive Therapy: A Look Ahead

Darrell R. Abernethy, MD, PhD, FACP

***. . . progress in the modern era of antihypertensive therapeutics has been primarily that of achieving the desired antihypertensive effect while decreasing adverse drug effects.***

During the past 35 years effective antihypertensive drugs have been available to the physician. For nearly that long it has been clear that reducing blood pressure in the hypertensive patient to a diastolic blood pressure of less than 90-95 mm Hg is associated with decreased incidence of stroke, hypertensive renal disease, congestive heart failure, and perhaps myocardial infarction. More recently it has become clear that treatment of systolic hypertension (systolic blood pressure >160 mmHg) markedly decreases the incidence of stroke and perhaps other end-organ disease in elderly patients. As depicted in Table 1, progress in the modern era of antihypertensive therapeutics has been primarily that of achieving the desired antihypertensive effect while decreasing adverse drug effects. This communication will discuss therapeutic approaches that are presently in development or considered targets for development during this decade.

## Angiotensin Receptor Blockers

With the delineation of the renin-angiotensin-aldosterone axis for blood pressure regulation, and the subsequent successful treatment of hypertension with angiotensin converting enzyme inhibitors (ACEI), other means of altering this axis are being explored. Angiotensin II effects are mediated through specific receptors found on vascular smooth muscle, renal mesangial cells, and a number of other relevant tissue targets. Recently two subtypes of angiotensin II receptors have been identified and characterized, and the "type 1" (AT-1) receptor (as contrasted to the "type 2" receptor) has been associated with angiotensin II-mediated cardiovascular effects.

A series of compounds which selectively block the AT-1 receptor are now in clinical development and appear to be effective antihypertensive agents. It is presently uncertain if such drugs will offer advantage over ACEI. However, it can be hypothesized that selective blockade of angiotensin II cardiovascular effect, in contrast to ACEI, which also inhibit the degradation of bradykinin, may decrease side effects such as cough which are occasionally associated with ACEI treatment. At present, not enough patients have received AT-1 receptor blockers to effectively test this hypothesis.

## Renin Inhibitors

Renin is the enzyme which cleaves angiotensin to form angiotensin I. Another approach to block the renin-angiotensin-aldosterone axis is inhibition of the enzymatic activity of renin. Although the first inhibitors of renin were described more than 20 years ago, these compounds such as pepstatin were rather nonspecific acidic and neutral protease inhibitors. Recently a series of di- and tripeptide compounds have been synthesized which specifically inhibit renin *in vivo*. A number of these drugs have been tested in hypertensive patients and noted to have substantial anti-hypertensive activity. Unfortunately, the presently available drugs have very limited oral bioavailability and the search is under way for "protected" peptides or non-peptide renin inhibitors which are stable in the gastrointestinal tract and efficiently absorbed into the systemic circulation. Again, a major rationale for development of such a class of drugs is that of specificity for the renin-angiotensin system.

## Potassium Channel Openers

Recently, the possibility that drugs may open vascular smooth muscle membrane potassium channels and, therefore, hyperpolarize the membrane and decrease conductance of other ion channels (sodium, calcium, chloride), has been demonstrated. Clinically the result of this mechanism of action is vascular smooth muscle relaxation and decreased blood pressure in hypertensive patients. A number of compounds which appear to have efficacy as antihypertensive drugs are in various stages of clinical development. In addition reevaluation of the mechanism of 2 older drugs, hydralazine and minoxidil, suggest that potassium channel opening may be important for their vasodilating effects. Supporting this possibility are the effects of pinacidil, the prototype potassium channel opener in development. Administration of pinacidil as single drug therapy to hypertensive patients results in tachycardia and sodium retention. This is similar to that observed when hydralazine or minoxidil are used as single drug therapy. As with these older drugs, pinacidil is also most effective when combined with a diuretic. Although a number of these drugs may become available during the 1990's it is unclear if they will provide an advance over present vasodilator drugs.

## Dopamine Receptor Agonists

Dopamine treatment has become synonymous with increase in blood pressure and is a cornerstone of cardiovascular support in an intensive care setting. These clinical effects of dopamine are the result of complex activation of pre-synaptic (dopamine type 2 [DA2]) and post-synaptic (dopamine type 1 [DA1]) dopamine re-

***ABBREVIATIONS USED***
***ACEI: angiotensin converting enzyme inhibitors***
***ANF: atrial natriuretic factor***
***AT-1: angiotensin II receptor type 1***
***DA: dopamine***
***ET: endothelin receptor***

*Darrell R. Abernethy, MD, PhD, FACP, is professor, Division of Clinical Pharmacology, Brown University School of Medicine, Providence, RI*

Table 1.—Antihypertensive Therapeutics

| Decade | Agents |
|---|---|
| Pre-1950s | barbiturates, bromides, bismuth subnitrate, thiocyanates |
| 1950s-60s | reserpine<br>mercurial diuretics<br>guanethidine<br>methyldopa<br>minoxidil, hydralazine |
| 1970s | thiazides, loop diuretics, potassium sparing diuretics<br>clonidine<br>β-adrenoceptor blockers<br>α-adrenoceptor blockers |
| 1980s | calcium antagonists<br>converting enzyme inhibitors |
| 1990s | angiotensin receptor blockers<br>renin inhibitors?<br>potassium channel openers<br>dopamine receptor agonists<br>serotonin receptor blockers<br>other? |

ceptors and beta-1, alpha-1, and alpha-2 adrenergic receptors. Selective activation of DA-1 receptors results in peripheral vasodilation and enhanced renal sodium excretion; it, therefore, has been an attractive target for antihypertensive drug development. Development of highly specific DA-1 agonists has been quite challenging. Currently, only one compound, fenoldopam, has been evaluated clinically. Its antihypertensive effects have been encouraging, but the drug has very limited systemic availability after oral administration. It remains unclear whether the promise of this therapeutic target will be realized. DA-2 agonists similarly have been proposed as a useful target for antihypertensive drug development. Activation of these presynaptic receptors leads to inhibition of sympathetic (norepinephrine) neurotransmitter release, vasodilation, and blood pressure reduction. Although relatively selective agonists such as bromocriptine, dihydroergotoxine, and propylbutyldopamine have hypotensive effects when evaluated in hypertensive patients or healthy subjects, receptor specificity, drug side effects, and oral bioavailability have limited the development of DA-2 agonists. If DA-2 agonists or combined DA-2/DA-1 agonists can be developed as oral drugs with an acceptable side effect profile, this mechanism of antihypertensive drug effect remains an attractive therapeutic target.

## Serotonin Receptor Blockers

Observation that serotonin may cause vascular smooth muscle contraction and platelet aggregation in certain experimental conditions created interest in development of serotonin receptor antagonists. After nearly


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a decade of basic and clinical investigation, ketanserin, the compound most extensively evaluated, has been confirmed to have an antihypertensive effect, although this is probably the result of alpha-1 adrenergic blockade. Ritanserin, a serotonin receptor blocker lacking alpha adrenergic effects, does not have antihypertensive activity either in the animal model or in hypertensive patients. Alteration of endogenous serotonin effect has remained a therapeutic target of some interest. If appropriate anti-serotonin compounds are developed which have antihypertensive properties, drug development with this class of compounds may again be initiated.

## Other Agents

The following therapeutic targets may be explored in the future. However, both mechanisms and potential compounds are much earlier in development.

**Atrial Natriuretic Factor (ANF):** Intense effort to ascertain the physiological effects of this endogenous peptide has demonstrated its potent vasodilatory and natriuretic effects. An ongoing effort to develop antihypertensive agents based on this useful combination of actions has to date been unfruitful. If the appropriate peptide analogs or nonpeptide ANF receptor agonists can be identified, it is conveivable that such substances would have a role in antihypertensive treatment.

**Endothelin Blockade**: Endothelin-1 is a newly discovered endogenous vasoconstrictor more potent than angiotensin II. It is secreted as a precursor polypeptide which is cleaved by a putatively specific enzyme ("endothelin converting enzyme") and has two identified specific plasma membrane receptors (ET-A, ET-B). The ET-A receptor apparently transduces the vascular smooth muscle vasoconstrictor stimulus; the function of the ET-B receptor is less well defined. The role of endothelin in human cardiovascular homeostasis is uncertain, but already there are intense efforts to develop both endothelin converting enzyme inhibitors and ET-A receptor antagonists. If the endothelin system has an important primary role in maintenance of peripheral vascular resistance in hypertensive patients, which should become clear over the next few years, development of drugs to alter endothelin vascular effects will increase.

**Other Polypeptide Growth Factors**: An ever-growing list of endogenous vasoactive polypeptides are being discovered and characterized. Platelet-derived growth factor, insulin-like growth factor, epidermal growth factor, and nerve growth factor, to name a few, have each demonstrated vascular effects in selected experimental systems. As the role of such substances for the maintenance of vascular homeostasis becomes defined, one can anticipate that targets for new drug development will become obvious.

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# HEALTH BY NUMBERS

Rhode Island
Department of Health
Barbara A. DeBuono, MD, MPH
Director of Health

# Hypertension Among Rhode Island Adults

Hypertension is a significant cause of heart disease and stroke. Although hypertension is eminently treatable with a combination of behavior change and medication, uncontrolled hypertension is extensive in the United States.[1] Accordingly, improved control of hypertension has been addressed in two of the nation's Year 2000 Health Objectives:

> Objective 15.4: "Increase to at least 50% the proportion of people with high blood pressure whose blood pressure is under control."[1]
>
> Objective 15.5: "Increase to at least 90% the proportion of people with high blood pressure who are taking action to help control their blood pressure."[1]

From 1976 to 1980, 38% of adult Americans were observed to have elevated blood pressure (systolic pressure of at least 140 mm Hg or diastolic pressure of at least 90 mm Hg) or to be under treatment for high blood pressure.[2] The prevalence of elevated blood pressure increases with age; it is more common among males than females and among blacks than whites.[2] Adult Americans are very likely to have had their blood pressure checked in the past year (87%). Of those with elevated blood pressure, 67% are currently taking medicine for it.[3]

In both 1990 and 1991 the Rhode Island Behavioral Risk Factor Surveillance System (BRFSS) conducted telephone interviews with about 1800 randomly selected Rhode Island adults with telephones. Questions were asked about screening for elevated blood pressure (1991 only), ever having been "told by a doctor, nurse, or other health professional that you have high blood pressure," and having medicine currently prescribed for elevated blood pressure, as well as sociodemographic items. In 1990 the Rhode Island Department of Health also conducted a health interview survey of 2566 randomly selected households in which an additional question was asked concerning control of elevated blood pressure for all household members.

Similar to other adults in this country, most Rhode Island adults (90%) reported having their blood pressure checked in the previous year (Figure 1). Twenty-three percent had ever been told by a health care provider that their blood pressure was elevated (Figure 2). If national observations made in 1976 to 1980 apply to Rhode Island in 1990, then up to 40% of Rhode Island adults with elevated blood pressure may not know it. The proportion of Rhode Island adults with known elevated blood pressure who have medication currently prescribed for it, 65%, is very similar to the 67% of American adults with known elevated blood pressure who reported taking prescribed medication for it (Figure 3). Curiously, 88% of Rhode Islanders with known elevated blood pressure reported their blood pressure to be under control, despite the smaller proportion who had been prescribed blood pressure medication and the even smaller proportion expected to be taking it as prescribed.

These statistics, particularly the suspected large number of persons with undiagnosed hypertension and the proportion of persons with diagnosed hypertension whose condition is uncontrolled, suggest the need for continuing public education about blood pressure screening and treatment for elevated blood pressure. In response, the Rhode Island Department of Health, in collaboration with the Rhode Island Affiliate of the American Heart Association and other members of the Rhode Island community, is organizing a long-term blood pressure awareness and education effort as part of a comprehensive cardiovascular health program based on the Year 2000 Health Objectives for the nation.

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*Submitted by Francis A. Donahue and John P. Fulton, PhD, Office of Chronic Disease Prevention and Health Promotion.* Health by Numbers *is edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD.*

Fig 1.—Percentage of Rhode Island residents who have had their blood pressure checked within the past year, by age and gender, 1991.

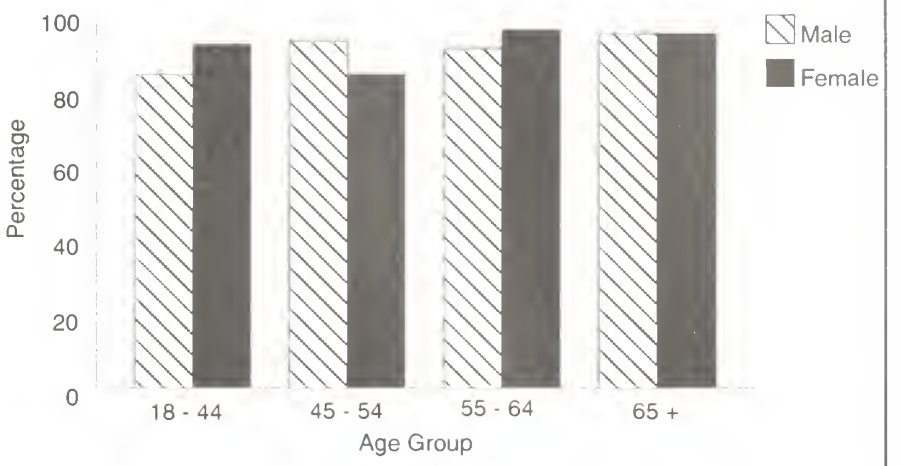



Fig 2.—Percentage of Rhode Island residents who have ever been told by a health care provider that their blood pressure is elevated, by age and gender, 1990-1991.

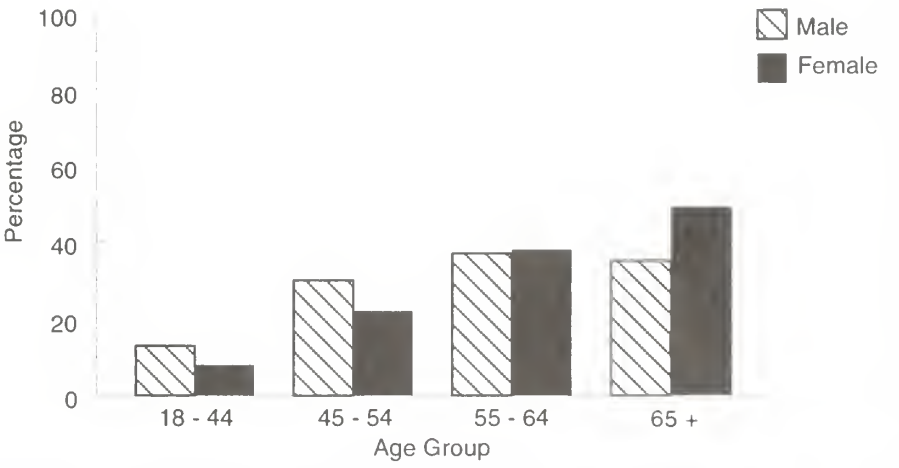
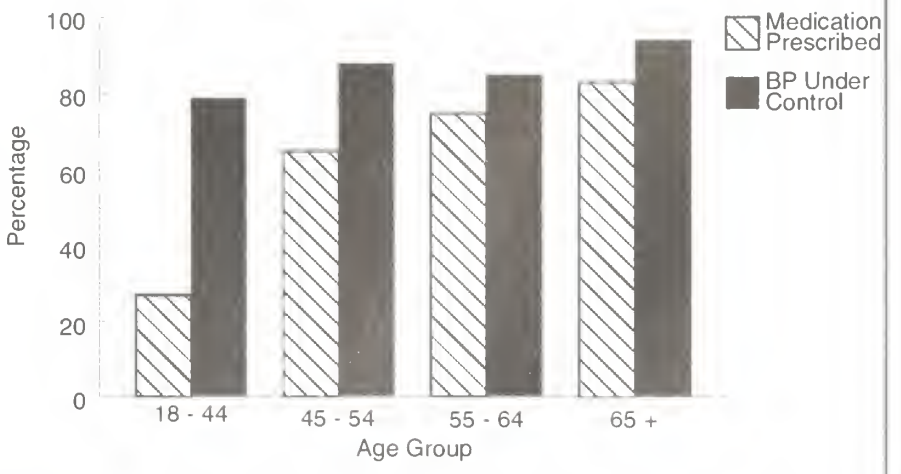



Fig 3.—Percentage of Rhode Island residents who have medicine currently prescribed for hypertension (1990-1991), and percentage of Rhode Island residents who report their blood pressure as under control (1990), among those who have ever been told by a health care provider that their blood pressure is elevated, by age.



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THE RHODE ISLAND MEDICAL JOURNAL

The Official Organ of the Rhode Island Medical Society
Issued Monthly under the direction of the Publication Committee

VOLUME 1
NUMBER 1

PROVIDENCE, R. I., JANUARY, 1917

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# THE RHODE ISLAND MEDICAL JOURNAL HERITAGE

## 90 Years Ago (May 1903)

The first editorial describes the merits (and hazards) in the use of liquid paraffin injection for the relief of nasal and facial deformities. This procedure, less than 20 years old, says the writer, has many uses in relieving pain and correcting visible deformities. The dangers come, he states, from defective technique or absence of asepsis, with the following possible complications: abscesses, sloughing of tissues, tetanus, chemical intoxication, and pulmonary embolism. But, he observes, "In nearly every case a reason for the unhappy result can be found in its method of administration and therefore condemns not the principle but its method of application." The technique involves the sterile injection of hot paraffin into subcutaneous tissues and the molding of the molten, waxy mass before it solidifies. The editorialist concludes: "In correcting saddle noses the method finds its greatest use, but the principle may be applied to any facial deformity where there is loss of substance. It has been successfully used to improve the contour of the neck and breasts, to fill the resulting destruction of tissue from operative procedures, to fill hollow cheeks, to contract the inguinal ring in hernia and to prevent vaginal prolapse."

A second editorial decries the lack of support for the newly published *Index Medicus,* noting that only 251 subscribers (in the entire profession, at home or abroad) have paid their annual fee of $5. There must be numerous hospitals, medical schools and laboratories where such a research resource would be needed. The Carnegie Foundation is currently supplying some temporary assistance to maintain the struggling publication.

The lead scientific article summarizes cases illustrating the value of bacteriological investigation of the conjunctival sac. The author, F.T. Rogers, MD, first identifies the organisms capable of causing conjunctival inflammation: the Weeks' bacillus, the gonococcus of Neisser and the diplobacillus of Morax-Axenfeld. He mentions other organisms that will produce inflammation but only under conditions of especial virulence, impaired vitality or local lesion (pneumococci, Klebs-Loeffler bacilli, staph-

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ylococci and streptococci.) After citing two cases in detail, he concludes that bacteriological examination of the conjunctival sac is of value to determine whether local surgery is safe to undertake, to determine prognosis, and "to determine certain etiological factors that may be of great value in prophylaxis and of equal service in possible malpractice suits."

George F. Keene, MD, offers a lengthy essay entitled, A Glimpse of Degeneracy. He begins by defining his terms. "Evolution and regeneration mark the destiny of the race. Involution and degeneration argue the existence of waste material. The first proposition is embodied in the Darwinian concept of the survival of the fittest; the second gives meaning to such terms as 'atavistic tendencies' and 'a reversion to the original type.' After a brief survey of the relative influences of nature and nurture, heredity and environmental pressure, Keene notes that, "There is established a defective organization which is accentuated at times by transmission." Further, he states: "The degenerate, like the poor, have always been with us and have sometimes stood forth in bold relief like Judas Iscariot and Oscar Wilde. Caligula, Nero and Commodius, though Roman Emperors, are examples of degenerates in high places." The degenerate, he contends, "always betrays himself by certain physical characteristics, stigmatas or marks." These include developmental asymmetry of the cranium, face, ears and teeth, prognathism, cleft palate, squint eyes, irregular teeth and marked deviations of the palatine arch. The position of the ear is held to be an important sign of degeneracy. The jug-handle shaped ear is a sign *par excellence* of degeneracy. In the sphere of behavior, the author contends that there are two dominant stigmata of degeneracy: obsessive behavior and impulsive behavior. He lists other psychiatric manifestations as follows: mysophobia (fear of contamination), claustrophobia, coprolalia ("unwilling ejaculation of oaths and filthy language"), kleptomania, dipsomania, and pyromania. He concludes, "This then is a rude picture of the penumbras of our civilization, the inevitable consequence of antecedent conditions, which is only the more emphasized, the more progressive the race."

## 50 Years Ago (May 1943)

Meyer Saklad, MD, Elihu Saklad, MD,and Priscilla Sellman, MD,write about inhalation therapy as an important adjunct to modern medical practice. Compressed gases may be employed in inhalation therapy to accomplish the following goals: To better supply oxygen to tissue; to effect nitrogen removal from body tissue or cavities; to change the density of the inspired atmosphere so that an increased minute volume exchange may result; and to alter the intrapulmonary pressure so that circulatory changes may be effected in the alveoli. The authors then present a clinical classification of hypoxia based upon its method of production. Further, they consider the factors, and the instruments, that are important in counteracting hypoxia by inhalation therapy.

Edmund T. Hackman, MD,provides the clinical details concerning a 5-year-old male, with a buttock splinter, who develops tetanus. The article contains a detailed account of the therapies and management used during the 8 weeks preceding the young patient's

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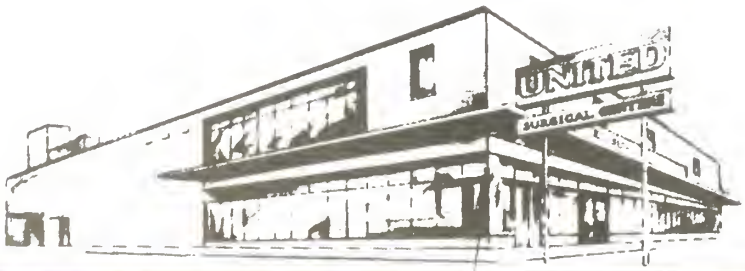

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full recovery.

The lead editorial expresses disappointment with the overall results of cancer education in the general community, noting that the goal of planting a little common sense has been replaced by planting only fear. Perhaps, the editorial observes, this sort of education should begin in early childhood and Rhode Island seems to be a proper laboratory for such an educational experiment.

## 25 Years Ago (May 1968)

The Health Message of President Lyndon B. Johnson, offered during the State of the Union Address of March 4, 1968, is presented in its entirety. Five major goals are enunciated: (1) To reduce sharply the inexcusably high infant mortality rate in the United States; (2) To meet the urgent need for more doctors, nurses and other health workers; (3) To deal with the soaring cost of medical care and to assure the most efficient use of our health resources; (4) To lower the shocking toll of deaths caused by accidents in America; and (5) To launch a nation-wide volunteer effort to improve the health of all Americans. These goals, the President states, will require an unprecedented national commitment and many years to achieve.

The 1967 Caleb Fiske Prize Essay is provided by Otto C. Phillips, MD, of Pittsburgh discussing the challenge of obstetric anesthesia. These past challenges, the author states, included a lack of effective agents and techniques, followed by substantial resistance to obstetric anesthesia on medical, sociologic and religious grounds. These objections have now been oversome. But, inadequate numbers of trained personnel remain the greatest current challenge. [*The Caleb Fiske Essay is considered the oldest such competition in the United States. It was initiated through a bequest by Dr Calerb Fiske, in 1834, to the Rhode Island Medical Society. Fiske had been the fourth President of the Society, serving from 1818 to 1823. He practiced medicine in Scituate. -Ed.)*

A case of spontaneous rupture of the spleen with pleural effusion and complicating pancreatitis is presented by Francis P. Catanzaro, MD, Mohammed Abiri, MD, and Salvatore Allegra, MD. In this case, there is histopathological evidence of peptic digestion in the hilar region of the spleen, which, in the opinion of the authors, was a contributing factor to the splenic rupture.

Eske Windsberg, MD, presents a case of small intestinal herniation through the foramen of Winslow.

Leonard J. Triedman, MD, discusses the diagnosis, prevention and management of complications of radical surgery for head and neck cancer.

A.A.Savastano, MD, describes the use of intrathecal administration of steroids as a means of allaying pains secondary to a post-operative arachnoiditis.

Psychosomatic problems in the athlete are discussed by Barry B. Mongillo, MD. After a number of illustrative cases, the author concludes: "As in combat, the outcome of a skirmish depends upon good leadership. It is, therefore, the duty of coaches and trainers to provide good leadership and to see to it that there is emotional balance and peace of mind among the members of the squad. A hard-boiled approach and discipline are necessary to mold good players into a winning team, but leadership and understanding must not be sacrificed."

A brief editorial notes that Brown University's President, Ray Heffner, has created a new division incorporating the biological and medical sciences. "It has also been implied in University circles that Brown will embark on the clinical years leading to the MD degree, during the next 2 or 3 years."


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To expedite production and ensure accuracy, authors are **strongly encouraged** to submit articles as well as computer-generated tables and figures on floppy diskette, formatted in any major MS-DOS or Windows word processor (eg, Microsoft Word, Wordperfect, Wordstar, Xywrite, Multimate, etc.) Macintosh disks will be accepted provided text is saved in an ASCII file. If possible, Macintosh disks should be saved in DOS format, using Apple File Exchange. Diskettes must be accompanied with at least one printed copy of the manuscript. Diskettes will be returned upon request.

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**Books:**
2. Hollingworth JW. *Local and Systemic Complications of Rheumatoid Arthritis.* Philadelphia, Pa: Saunders; 1968.

**Book Chapter**
3. Epstein WL. Erythema nodosum. In: Samter M, ed. *Immunological Diseases,* 2nd ed. Boston, Mass.: Little, Brown; 1971;2:944-951.

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## WARNINGS

**Liver Enzymes:** HMG-CoA reductase inhibitors, like some other lipid-lowering therapies, have been associated with biochemical abnormalities of liver function. Increases of serum transaminase (ALT, AST) values to more than 3 times the upper limit of normal occurring on 2 or more (not necessarily sequential) occasions have been reported in 1.3% of patients treated with pravastatin in the U.S. over an average period of 18 months. These abnormalities were not associated with cholestasis and did not appear to be related to treatment duration. In those patients in whom these abnormalities were believed to be related to pravastatin and who were discontinued from therapy, the transaminase levels usually fell slowly to pretreatment levels. These biochemical findings are usually asymptomatic although worldwide experience indicates that anorexia, weakness, and/or abdominal pain may also be present in rare patients.

As with other lipid-lowering agents, liver function tests should be performed during therapy with pravastatin. Serum aminotransferases, including ALT (SGPT), should be monitored before treatment begins, every six weeks for the first three months, every eight weeks during the remainder of the first year, and periodically thereafter (e.g., at about six-month intervals). Special attention should be given to patients who develop increased transaminase levels. Liver function tests should be repeated to confirm an elevation and subsequently monitored at more frequent intervals. If increases in AST and ALT equal or exceed three times the upper limit of normal and persist, then therapy should be discontinued. Persistence of significant aminotransferase elevations following discontinuation of therapy may warrant consideration of liver biopsy.

Active liver disease or unexplained transaminase elevations are contraindications to the use of pravastatin (see CONTRAINDICATIONS). Caution should be exercised when pravastatin is administered to patients with a history of liver disease or heavy alcohol ingestion (see CLINICAL PHARMACOLOGY, Pharmacokinetics/Metabolism). Such patients should be closely monitored, started at the lower end of the recommended dosing range, and titrated to the desired therapeutic effect.

**Skeletal Muscle: Rhabdomyolysis with renal dysfunction secondary to myoglobinuria has been reported with pravastatin and other drugs in this class.** Uncomplicated myalgia has also been reported in pravastatin-treated patients (see ADVERSE REACTIONS). Myopathy, defined as muscle aching or muscle weakness in conjunction with increases in creatine phosphokinase (CPK) values to greater than 10 times the upper limit of normal was reported to be possibly due to pravastatin in only one patient in clinical trials (<0.1%). Myopathy should be considered in any patient with diffuse myalgias, muscle tenderness or weakness, and/or marked elevation of CPK. Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever. **Pravastatin therapy should be discontinued if markedly elevated CPK levels occur or myopathy is diagnosed or suspected. Pravastatin therapy should also be temporarily withheld in any patient experiencing an acute or serious condition predisposing to the development of renal failure secondary to rhabdomyolysis, e.g., sepsis; hypotension; major surgery; trauma; severe metabolic, endocrine, or electrolyte disorders; or uncontrolled epilepsy.**

The risk of myopathy during treatment with lovastatin is increased if therapy with either cyclosporine, gemfibrozil, erythromycin, or niacin is administered concurrently. There is no experience with the use of pravastatin together with cyclosporine. Myopathy has not been observed in clinical trials involving small numbers of patients who were treated with pravastatin together with niacin. One trial of limited size involving combined therapy with pravastatin and gemfibrozil showed a trend toward more frequent CPK elevations and patient withdrawals due to musculoskeletal symptoms in the group receiving combined treatment as compared with the groups receiving placebo, gemfibrozil, or pravastatin monotherapy. Myopathy was not reported in this trial (see PRECAUTIONS, Drug Interactions). One patient developed myopathy when clofibrate was added to a previously well tolerated regimen of pravastatin, the myopathy resolved when clofibrate therapy was stopped and pravastatin treatment continued. **The use of fibrates alone may occasionally be associated with myopathy. The combined use of pravastatin and fibrates should generally be avoided.**

## PRECAUTIONS

**General:** Pravastatin may elevate creatine phosphokinase and transaminase levels (see ADVERSE REACTIONS). This should be considered in the differential diagnosis of chest pain in a patient on therapy with pravastatin.

*Homozygous Familial Hypercholesterolemia*: Pravastatin has not been evaluated in patients with rare homozygous familial hypercholesterolemia. In this group of patients, it has been reported that HMG-CoA reductase inhibitors are less effective because the patients lack functional LDL receptors.

*Renal Insufficiency*: A single 20 mg oral dose of pravastatin was administered to 24 patients with varying degrees of renal impairment (as determined by creatinine clearance). No effect was observed on the pharmacokinetics of pravastatin or its 3α-hydroxy isomeric metabolite (SQ 31,906). A small increase was seen in mean AUC values and half-life (t1/2) for the inactive enzymatic ring hydroxylation metabolite (SQ 31,945). Given this small sample size, the dosage administered, and the degree of individual variability, patients with renal impairment who are receiving pravastatin should be closely monitored.

**Information for Patients:** Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever.

**Drug Interactions:** *Immunosuppressive Drugs, Gemfibrozil, Niacin (Nicotinic Acid), Erythromycin*: See WARNINGS' Skeletal Muscle.

*Antipyrine*: Clearance by the cytochrome P450 system was unaltered by concomitant administration of pravastatin. Since pravastatin does not appear to induce hepatic drug-metabolizing enzymes, it is not expected that any significant interaction of pravastatin with other drugs (e.g., phenytoin, quinidine) metabolized by the cytochrome P450 system will occur.

*Cholestyramine/Colestipol*: Concomitant administration resulted in an approximately 40 to 50% decrease in the mean AUC of pravastatin. However, when pravastatin was administered 1 hour before or 4 hours after cholestyramine or 1 hour before colestipol and a standard meal, there was no clinically significant decrease in bioavailability or therapeutic effect. (See DOSAGE AND ADMINISTRATION, Concomitant Therapy.)

*Warfarin*: In a study involving 10 healthy male subjects given pravastatin and warfarin concomitantly for 6 days, bioavailability parameters at steady state for pravastatin (parent compound) were not altered. Pravastatin did not alter the plasma protein-binding of warfarin. Concomitant dosing did increase the AUC and Cmax of warfarin but did not produce any changes in its anticoagulant action (i.e., no increase was seen in mean prothrombin time after 6 days of concomitant therapy). However, bleeding and extreme prolongation of prothrombin time has been reported with another drug in this class. Patients receiving warfarin-type anticoagulants should have their prothrombin times closely monitored when pravastatin is initiated or the dosage of pravastatin is changed.

*Cimetidine*: The $AUC_{0\text{-}12hr}$ for pravastatin when given with cimetidine was not significantly different from the AUC for pravastatin when given alone. A significant difference was observed between the AUC's for pravastatin when given with cimetidine compared to when administered with antacid.

*Digoxin*: In a crossover trial involving 18 healthy male subjects given pravastatin and digoxin concurrently for 9 days, the bioavailability parameters of digoxin were not affected. The AUC of pravastatin tended to increase, but the overall bioavailability of pravastatin plus its metabolites SQ 31,906 and SQ 31,945 was not altered.

*Gemfibrozil*: In a crossover study in 20 healthy male volunteers given concomitant single doses of pravastatin and gemfibrozil, there was a significant decrease in urinary excretion and protein binding of pravastatin. In addition, there was a significant increase in AUC, Cmax, and Tmax for the pravastatin metabolite SQ 31,906. Combination therapy with pravastatin and gemfibrozil is generally not recommended.

In interaction studies with *aspirin, antacids* (1 hour prior to PRAVACHOL), *cimetidine, nicotinic acid*, or *probucol*, no statistically significant differences in bioavailability were seen when PRAVACHOL (pravastatin sodium) was administered.

*Other Drugs*: During clinical trials, no noticeable drug interactions were reported when PRAVACHOL was added to: diuretics, antihypertensives, digitalis, converting-enzyme inhibitors, calcium channel blockers, beta-blockers, or nitroglycerin.

**Endocrine Function:** HMG-CoA reductase inhibitors interfere with cholesterol synthesis and lower circulating cholesterol levels and, as such, might theoretically blunt adrenal or gonadal steroid hormone production. Results of clinical trials with pravastatin in males and post-menopausal females were inconsistent with regard to possible effects of the drug on basal steroid hormone levels. In a study of 21 males, the mean testosterone response to human chorionic gonadotropin was significantly reduced ($p<0.004$) after 16 weeks of treatment with 40 mg of pravastatin. However, the percentage of patients showing a ≥50% rise in plasma testosterone after human chorionic gonadotropin stimulation did not change significantly after therapy in these patients. The effects of HMG-CoA reductase inhibitors on spermatogenesis and fertility have not been studied in adequate numbers of patients. The effects, if any, of pravastatin on the pituitary-gonadal axis in pre-menopausal females are unknown. Patients treated with pravastatin who display clinical evidence of endocrine dysfunction should be evaluated appropriately. Caution should also be exercised if an HMG-CoA reductase inhibitor or other agent used to lower cholesterol levels is administered to patients also receiving other drugs (e.g., ketoconazole, spironolactone, cimetidine) that may diminish the levels or activity of steroid hormones.

**CNS Toxicity:** CNS vascular lesions, characterized by perivascular hemorrhage and edema and mononuclear cell infiltration of perivascular spaces, were seen in dogs treated with pravastatin at a dose of 25 mg/kg/day, a dose that produced a plasma drug level about 50 times higher than the mean drug level in humans taking 40 mg/day. Similar CNS vascular lesions have been observed with several other drugs in this class.

A chemically similar drug in this class produced optic nerve degeneration (Wallerian degeneration of retinogeniculate fibers) in clinically normal dogs in a dose-dependent fashion starting at 60 mg/kg/day, a dose that produced mean plasma drug levels about 30 times higher than the mean drug level in humans taking the highest recommended dose (as measured by total enzyme inhibitory activity). This same drug also produced vestibulocochlear Wallerian-like degeneration and retinal ganglion cell chromatolysis in dogs treated for 14 weeks at 180 mg/kg/day, a dose which resulted in a mean plasma drug level similar to that seen with the 60 mg/kg dose.

**Carcinogenesis, Mutagenesis, Impairment of Fertility:** In a 2-year study in rats fed pravastatin at doses of 10, 30, or 100 mg/kg body weight, there was an increased incidence of hepatocellular carcinomas in males at the highest dose ($p<0.01$). Although rats were given up to 125 times the human dose (HD) on a mg/kg body weight basis, their serum drug levels were only 6 to 10 times higher than those measured in humans given 40 mg pravastatin as measured by AUC.

The oral administration of 10, 30, or 100 mg/kg (producing plasma drug levels approximately 0.5 to 5.0 times human drug levels at 40 mg) of pravastatin to mice for 22 months resulted in a statistically significant increase in the incidence of malignant lymphomas in treated females when all treatment groups were pooled and compared to controls ($p<0.05$). The incidence was not dose-related and male mice were not affected.

A chemically similar drug in this class was administered to mice for 72 weeks at 25, 100, and 400 mg/kg body weight, which resulted in mean serum drug levels approximately 3, 15, and 33 times higher than the mean human serum drug concentration (as total inhibitory activity) after a 40 mg oral dose. Liver carcinomas were significantly increased in high-dose females and mid- and high-dose males, with a maximum incidence of 90 percent in males. The incidence of adenomas of the liver was significantly increased in mid- and high-dose females. Drug treatment also significantly increased the incidence of lung adenomas in mid- and high-dose males and females. Adenomas of the eye Harderian gland (a gland of the eye of rodents) were significantly higher in high-dose mice than in controls.

No evidence of mutagenicity was observed *in vitro*, with or without rat-liver metabolic activation, in the following studies: microbial mutagen tests, using mutant strains of *Salmonella typhimurium* or *Escherichia coli*, a forward mutation assay in L5178Y TK +/− mouse lymphoma cells, a chromosomal aberration test in hamster cells, and a gene conversion assay using *Saccharomyces cerevisiae*. In addition, there was no evidence of mutagenicity in either a dominant lethal test in mice or a micronucleus test in mice.

In a study in rats, with daily doses up to 500 mg/kg, pravastatin did not produce any adverse effects on fertility or general reproductive performance. However, in a study with another HMG-CoA reductase inhibitor, there was decreased fertility in male rats treated for 34 weeks at 25 mg/kg body weight, although this effect was not observed in a subsequent fertility study when this same dose was administered for 11 weeks (the entire cycle of spermatogenesis, including epididymal maturation). In rats treated with this same reductase inhibitor at 180 mg/kg/day, seminiferous tubule degeneration (necrosis and loss of spermatogenic epithelium) was observed. Although not seen with pravastatin, two similar drugs in this class caused drug-related testicular atrophy, decreased spermatogenesis, spermatocytic degeneration, and giant cell formation in dogs. The clinical significance of these findings is unclear.

**Pregnancy: Pregnancy Category X:** See CONTRAINDICATIONS.

Safety in pregnant women has not been established. Pravastatin was not teratogenic in rats at doses up to 1000 mg/kg daily or in rabbits at doses of up to 50 mg/kg daily. These doses resulted in 20x (rabbit) or 240x (rat) the human exposure based on surface area ($mg/meter^2$). However, in studies with another HMG-CoA reductase inhibitor, skeletal malformations were observed in rats and mice. PRAVACHOL (pravastatin sodium) should be administered to women of child-bearing potential only when such patients are highly unlikely to conceive and have been informed of the potential hazards. If the woman becomes pregnant while taking PRAVACHOL (pravastatin sodium), it should be discontinued and the patient advised again as to the potential hazards to the fetus.

**Nursing Mothers:** A small amount of pravastatin is excreted in human breast milk. Because of the potential for serious adverse reactions in nursing infants, women taking PRAVACHOL should not nurse (see CONTRAINDICATIONS).

**Pediatric Use:** Safety and effectiveness in individuals less than 18 years old have not been established. Hence, treatment in patients less than 18 years old is not recommended at this time. (See also PRECAUTIONS, **General**.)

## ADVERSE REACTIONS

Pravastatin is generally well tolerated, adverse reactions have usually been mild and transient. In 4-month long placebo-controlled trials, 1.7% of pravastatin-treated patients and 1.2% of placebo-treated patients were discontinued from treatment because of adverse experiences attributed to study drug therapy; this difference was not statistically significant. In long-term studies, the most common reasons for discontinuation were asymptomatic serum transaminase increases and mild, non-specific gastrointestinal complaints. During clinical trials the overall incidence of adverse events in the elderly was not different from the incidence observed in younger patients.

**Adverse Clinical Events:** All adverse clinical events (regardless of attribution) reported in more than 2% of pravastatin-treated patients in the placebo-controlled trials are identified in the table below, also shown are the percentages of patients in whom these medical events were believed to be related or possibly related to the drug.

| | All Events % | | Events Attributed to Study Drug % | |
|---|---|---|---|---|
| Body System/Event | Pravastatin (N = 900) | Placebo (N = 411) | Pravastatin (N = 900) | Placebo (N = 411) |
| Cardiovascular | | | | |
| Cardiac Chest Pain | 4.0 | 3.4 | 0.1 | 0.0 |
| Dermatologic | | | | |
| Rash | 4.0* | 1.1 | 1.3 | 0.9 |
| Gastrointestinal | | | | |
| Nausea/Vomiting | 7.3 | 7.1 | 2.9 | 3.4 |
| Diarrhea | 6.2 | 5.6 | 2.0 | 1.9 |
| Abdominal Pain | 5.4 | 6.9 | 2.0 | 3.9 |
| Constipation | 4.0 | 7.1 | 2.4 | 5.1 |
| Flatulence | 3.3 | 3.6 | 2.7 | 3.4 |
| Heartburn | 2.9 | 1.9 | 2.0 | 0.7 |
| General | | | | |
| Fatigue | 3.8 | 3.4 | 1.9 | 1.0 |
| Chest Pain | 3.7 | 1.9 | 0.3 | 0.2 |
| Influenza | 2.4* | 0.7 | 0.0 | 0.0 |
| Musculoskeletal | | | | |
| Localized Pain | 10.0 | 9.0 | 1.4 | 1.5 |
| Myalgia | 2.7 | 1.0 | 0.6 | 0.0 |
| Nervous System | | | | |
| Headache | 6.2 | 3.9 | 1.7* | 0.2 |
| Dizziness | 3.3 | 3.2 | 1.0 | 0.5 |
| Renal/Genitourinary | | | | |
| Urinary Abnormality | 2.4 | 2.9 | 0.7 | 1.2 |
| Respiratory | | | | |
| Common Cold | 7.0 | 6.3 | 0.0 | 0.0 |
| Rhinitis | 4.0 | 4.1 | 0.1 | 0.0 |
| Cough | 2.6 | 1.7 | 0.1 | 0.0 |

*Statistically significantly different from placebo.

The following effects have been reported with drugs in this class:

*Skeletal*: myopathy, rhabdomyolysis.

*Neurological*: dysfunction of certain cranial nerves (including alteration of taste, impairment of extra-ocular movement, facial paresis), tremor, vertigo, memory loss, paresthesia, peripheral neuropathy, peripheral nerve palsy.

*Hypersensitivity Reactions*: An apparent hypersensitivity syndrome has been reported rarely which has included one or more of the following features: anaphylaxis, angioedema, lupus erythematous-like syndrome, polymyalgia rheumatica, vasculitis, purpura, thrombocytopenia, leukopenia, hemolytic anemia, positive ANA, ESR increase, arthritis, arthralgia, urticaria, asthenia, photosensitivity, fever, chills, flushing, malaise, dyspnea, toxic epidermal necrolysis, erythema multiforme, including Stevens-Johnson syndrome.

*Gastrointestinal*: pancreatitis, hepatitis, including chronic active hepatitis, cholestatic jaundice, fatty change in liver, and, rarely, cirrhosis, fulminant hepatic necrosis, and hepatoma, anorexia, vomiting.

*Reproductive*: gynecomastia, loss of libido, erectile dysfunction.

*Eye*: progression of cataracts (lens opacities), ophthalmoplegia.

**Laboratory Test Abnormalities:** Increases in serum transaminase (ALT, AST) values and CPK have been observed (see WARNINGS).

Transient, asymptomatic eosinophilia has been reported. Eosinophil counts usually returned to normal despite continued therapy. Anemia, thrombocytopenia, and leukopenia have been reported with other HMG-CoA reductase inhibitors.

**Concomitant Therapy:** Pravastatin has been administered concurrently with cholestyramine, colestipol, nicotinic acid, probucol and gemfibrozil. Preliminary data suggest that the addition of either probucol or gemfibrozil to therapy with lovastatin or pravastatin is **not** associated with greater reduction in LDL-cholesterol than that achieved with lovastatin or pravastatin alone. No adverse reactions unique to the combination or in addition to those previously reported for each drug alone have been reported. Myopathy and rhabdomyolysis (with or without acute renal failure) have been reported when another HMG-CoA reductase inhibitor was used in combination with immunosuppressive drugs, gemfibrozil, erythromycin, or lipid-lowering doses of nicotinic acid. Concomitant therapy with HMG-CoA reductase inhibitors and these agents is generally not recommended. (See WARNINGS, **Skeletal Muscle** and PRECAUTIONS, **Drug Interactions**.)

## OVERDOSAGE

There have been no reports of overdoses with pravastatin.

Should an accidental overdose occur, treat symptomatically and institute supportive measures as required.

(J4-422A)

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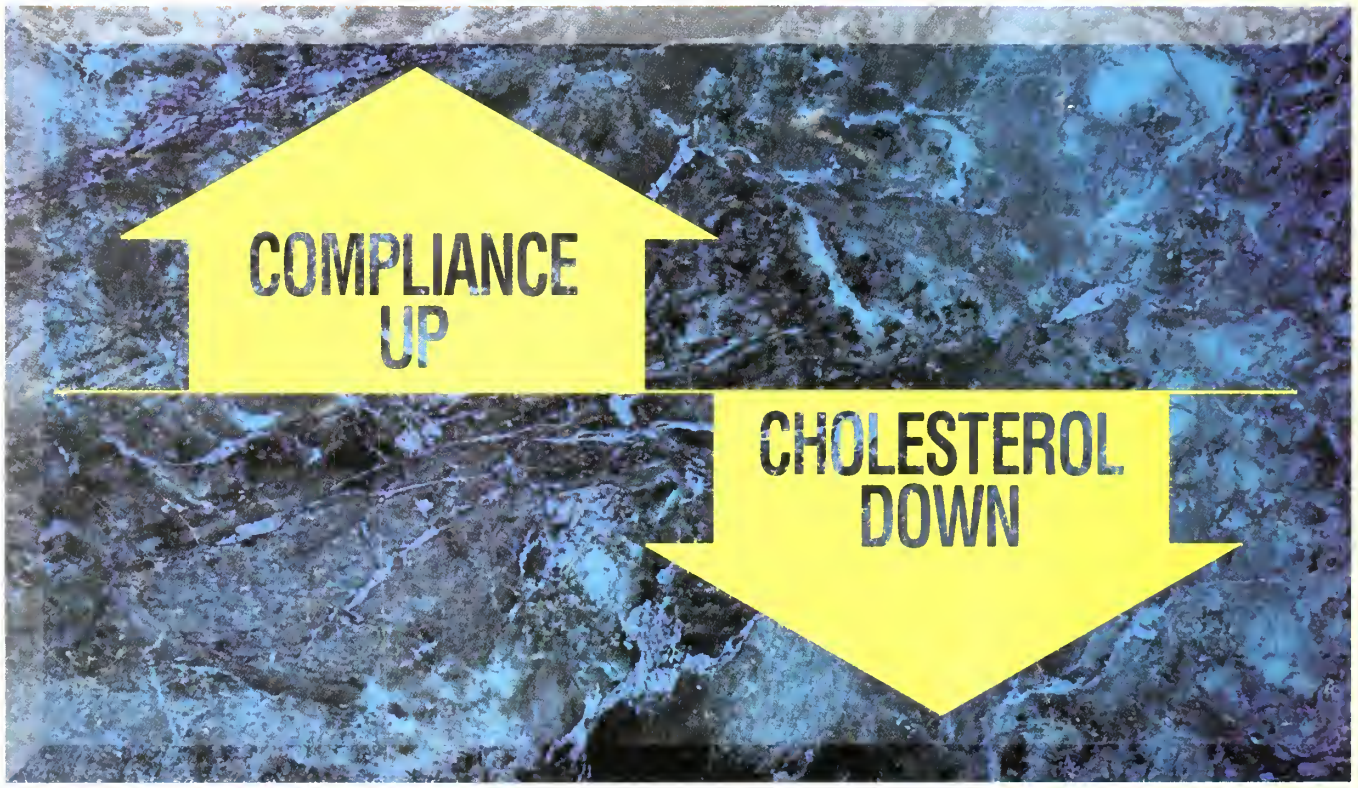


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**Rhode Island Medicine** is owned and published monthly by the Rhode Island Medical Society, 106 Francis Street, Providence, Rhode Island 02903, Ph: 401-331-3207. Single copies $4.00 — Subscriptions $40.00 per year (members of the Rhode Island Medical Society — $5.00 annually). Published articles represent opinions of the authors and do not necessarily reflect the official policy of the Rhode Island Medical Society unless clearly specified. Advertisements do not imply sponsorship or endorsement by the Rhode Island Medical Society. Second class postage paid at Providence, Rhode Island. **ISSN 1061-222X.** POSTMASTER: Send address changes to RHODE ISLAND MEDICINE, 106 Francis Street, Providence, RI 02903. Advertising Representative: Narragansett Graphics, 9 Marriot Avenue, Westerly, Rhode Island 0289 Phone: (401)596-0117. FAX. (401) 596-7799. National Advertising Bureau: State Medical Journal Advertising Bureau, Inc., 711 South Blvd., Oak Park, Illinois 60302. Phone 708-383-8800.

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# COMMENTARIES

## Family Medicine in Rhode Island

*"The happiest and most useful lot given to man — to become vigorous, whole-souled, intelligent general practitioners"*

William Osler:
The Master Word in Medicine

In 1902, William Osler commented that "it is amusing to read and hear of the passing of the family physician. There never was a time in our history in which he was so much in evidence." Osler might be surprised by the turn of events since his visits to the Rhode Island Medical Society nearly a century ago. No doubt, he would be concerned about the serious imbalance among generalists and subspecialists throughout New England. I think he would be impressed, however, by the resilience of family medicine, its innovative educational contributions, the research and scholarly foundation that is being established for this discipline and the quality and altruism of its graduates.

In spite of formidable obstacles from academic medicine, family medicine evolved over a 25-year period following World War II to be designated an official specialty in 1969. Even though many dedicated medical leaders worked hard for this development, perhaps its greatest impetus came from the social movements of the '60s. During these years, several major national commissions described our country's need for well trained family physicians to whom patients could turn for care regardless of their age, sex or organ specific dysfunction, even when their dis-ease was vague or undifferentiated. Patients, thus, would be assured of a comprehensive approach and continuous therapeutic relationship with a trusted physician extending from preconception to death with dignity and equanimity. Furthermore, these commissions concluded that the family physician's education should incorporate insights from the social and behavioral disciplines, humanities and epidemiology as well as the traditional biomedical perspective. This approach would help these new physicians better understand the impact of economics, environmental factors and psychosocial influences on the health of their patients and their communities.

Many have wondered whether these expectations are realistic today when there is such a proliferation of medical knowledge and technology. Numerous studies have confirmed the quality of care provided by the family physician, whether within the hospital or ambulatory setting. Nevertheless, some of the best answers to this concern can be found in the pages of this issue of *Rhode Island Medicine*. Entin encapsulates these expectations beautifully and succinctly in her poignant vignette as does Davis in his portrayal of the daily activities of a family physician. In a separate article, Davis responds to the "myths" of detractors and, in so doing, delineates a realistic, attainable conceptual framework for family medicine. This discipline can also be defined by the performance of its members as suggested by Davis' third contribution, which describes our graduates' versatility and success in a variety of locations and practice arrangements throughout Rhode Island and adjacent states. Nationally, they are providing care in metropolitan areas, suburbs, inner cities, small towns, Indian reservations and rural sites as remote as Alaska. Like its graduates, the breadth of family medicine is extensive, embracing insights from a wide range of disciplines. For instance, Kenyon relates the importance of psychosocial and cultural influences on patient care and how these concepts are taught in the medical setting. Hume describes the formidable challenges to generalists created by the proliferation of new drugs. She stresses the importance of providing sound pharmacological training in the residency years, which incorporates current technological resources and our knowledge of how to achieve compliance based on a supportive, sensitive doctor-patient relationship. And Jack, Culpepper, Carlough and Warner provide a cogent rationale for training family physicians in obstetrics. Their efforts to promote family-centered obstetrical care have significant implications for reducing risks and costs, improving access and enhancing the health of mothers and their infants, especially the poor and those living in rural areas.

Jack, Culpepper, Anandarajah and Shea also describe a natural outgrowth of family medicine's social heritage through linkage of our department with community health centers. This association has unique educational implications, allowing us to provide training to medical students, residents, and maternal and child health fellows that is responsive to the needs of the underserved. This approach has received national recognition and is being promoted by the Health Resources and Services Administration (HRSA) and the Public Health Service as a model for other residencies. The development of our association with the Black-

stone Valley Community Health Centers was a challenging endeavor requiring unusual dedication and commitment from a variety of physicians and community leaders. Finally, Culpepper raises disturbing questions regarding our management of common health problems using low back pain and acute otitis media as prototypes. Much of the published medical literature derived from highly selected tertiary care populations does not answer the common clinical questions presented by the patients, families and communities we serve. The cost to society from our lack of knowledge in these areas accentuates the vital importance and fascinating opportunities for research in family medicine, using health centers and communities as our "laboratories."

I would like to thank Steve Davis for editing this issue of *Rhode Island Medicine* and Stan Aronson for his steadfast encouragement. Our department also owes a great debt to the formative contributions of David Greer, Jack Cunningham and Lou Hochheiser, to the foresight and support of Frank Dietz and the trustees of Memorial Hospital, and to our faculty, both academic and clinical, who have given so much of their time, talents and efforts. May this issue mark family medicine's progress in Rhode Island while at the same time challenge us to face the future in a manner that is faithful to our principles. Medicine will evolve in ways we can hardly imagine as we enter the next millennium. Yet, as health care systems change and medical knowledge increases in complexity and subspecialization, reduced to smaller and smaller compartments, patients will always need well trained "vigorous, wholesouled, intelligent general practitioners." The need for comprehensive, coordinated, continuous, cost-effective and personal care is universal. Family medicine is based on these principles, and we are fortunate to have the opportunity to teach and delineate the scientific and conceptual aspects of our foundation in academic institutions such as Brown University and Memorial Hospital. At the same time, we value the supportive environment in the Rhode Island medical community that allows us to demonstrate the positive aspects of our approach and to work in a collaborative manner with other specialties. This collegiality will be enhanced by mutual understanding and appreciation as we all strive to provide the best possible care to our patients.

Vincent R. Hunt, MD, Chairman
Department of Family Medicine
Brown University/Memorial
Hospital of Rhode Island

## Eight Myths of Family Medicine

**Family physicians do only health maintenance, or family physicians deal only with family problems.**

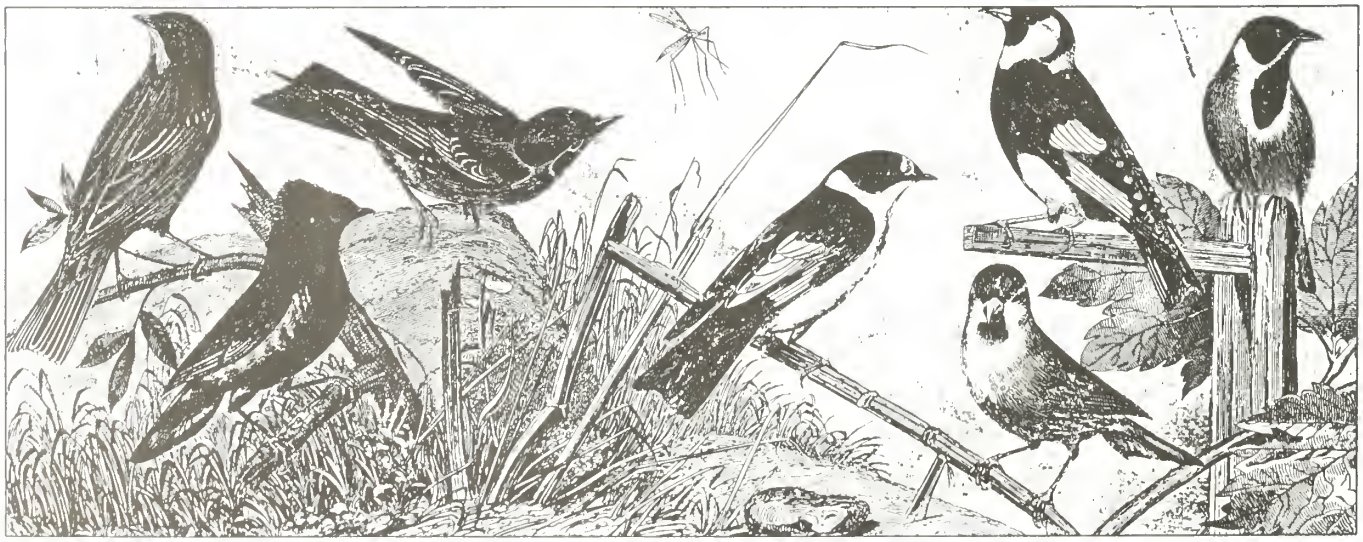
Health maintenance is not all that family doctors do in their practices. Family physicians take care of more than 90% of the primary care problems that present to their offices. Family physicians do consider health maintenance and psychosocial issues important and emphasize them in their care of patients, but they provide a very wide assortment of care. Ironically, family physicians are more often accused of being too broad in their practices.

**Family physicians have boring, routine practices since they see common problems like colds repeatedly.**

Admittedly, common problems are common in office practice, but there are several reasons why family physicians' practices usually are not boring. First, the old adage that uncommon presentations of common problems are more frequent than common presentations of uncommon problems-so even common problems can be a challenge. Second, most family physicians will use the office visit for a common problem in an additional way-to counsel a teenager with an upper respiratory infection about smoking, to arrange for a screening mammogram for an infrequently seen elderly woman presenting with a urinary tract infection, or to follow up on a more chronic problem such as hypertension or spouse alcohol abuse. Third, unusual problems usually present first to a primary care provider, so family physicians must be constantly on the alert for them.

**Being a family physician is intellectually simple: the brighter medical students are wasting their talents by pursuing family medicine.**

The breadth and diversity of family medicine make it an intellectual challenge. The variety of problems, the variations in the presentations of dis-



ease, the complexities of the interrelationships of medical and psychosocial issues, the challenges of dealing with a wide variety of patients and their illnesses through the life span contribute to making family medicine difficult. This "myth" contrasts directly with the next.

**There is too much to know in family medicine to master it all.**

Just the opposite of the last "myth." Certainly, there is too much to know in medicine for anyone to master it all. Family medicine recognizes this fact and adapts to it in several ways: first, by training students and residents to be masters of the common problems and to be able to recognize the uncommon; second, by accepting the fact that all physicians have limits, and that the best care is provided when physicians know their limits and know when to get advice or to make appropriate referrals. Family medicine is not the only specialty that does this; specialists will commonly refer to subspecialists, like the ophthalmologist who will send a patient to a retina specialist, or a general cardiologist who will send a patient to an invasive cardiologist.

**Family physicians are "jacks-of-all trades," masters of none.**

Family physicians are masters of common medical problems, masters of the influences of psychosocial issues on their patients' health, and masters of preventive medicine throughout the life span.

**If you are really sick you need, want, or deserve a specialist, not a family physician**.

Indeed, if you are really sick you will probably benefit from the care of a specialist or, in the case of many patients in tertiary care hospitals, of many specialists. Nevertheless, the sicker you are and the more specialists you have involved in your care, the more you will need a family physician to help you understand your illness, to guide you through the maze of tests, procedures, rationales, explanations, diagnoses, and prognoses that you will be subject to, and to help you and your family cope with the complicated, sometimes contradictory, and often depressing phenomenon of being ill.

**Family medicine cannot be practiced in the Northeast.**

There is a need for more primary care providers in the Northeast even with the "surplus" of doctors and because patients often appreciate the type of care that family physicians can provide.

**Family medicine residents should not be trained in obstetrics since they will not be doing it in their later practices.**

Twenty-eight percent of the family physicians in the United States include obstetrics in their practices. Even if a family doctor chooses not to do obstetrics in his or her later practice, there are many pregnancy-related issues-such as miscarriage, ectopic pregnancy, post-partum endometritis-that family physicians will care for in their practices.

Stephen W. Davis, MD

## Blunt Words

Why can't you physicians talk in simple, readily understandable terms? Why must you obfuscate with legions of polysyllabic Greco-Latin words rather than use the blunt but elemental language of everyday discourse? Is basic English such a foreign tongue to you? Do you perhaps believe that opaque, exotic words are needed to justify your fees?"

These comments were spoken, some years back, by a social sciences professor at Brown. His argument, which seems so sensible at first glance, is that the least complex way of saying something is frequently the best way; that *effective* communication is to be judged solely by the clarity, directness and simplicity of the message. Specifically, he advocated a tilt toward Anglo-Saxon words; that we employ the pungent language of the marketplace rather than the enigmatic vocabulary of the classicist. Slang, in his view, works better: it has the element of brevity; it is readily understood by most everyone; and it reeks of human sweat rather than marble dust. Furthermore, in the immortal words of Winnie the Pooh, "I am a Bear of very little Brain, and long Words bother me."

A story is told of a small community hospital in New York City that had been absorbed by a local medical school. A new full-time chief of medicine was assigned to bring the institution up to academic standards. A few days after his arrival the new clinical chief received a surgical pathology report on a biopsied lymph node submitted by a pathologist who had been with the institution for many years. The final diagnosis read: "This is a very bad tumor spreading all over. It doesn't look like anything recognizable, and I don't know where it came from." The professor of medicine stormed down to the pathologist's office and complained bitterly of the inexcusably unscientific language of the report and demanded a more proper diagnosis. The next day he received a modified report: "Biopsy shows an anaplastic, infiltrating metastatic neoplasm of undetermined origin." Again, the professor returned to the pathologist's office, this time saying, "Now, this is a report that I can understand and work with!"

This tale suggests that medicine sometimes hides its ignorance behind a shield of pomposity and that it uses language to dazzle rather than illuminate. Let us consider, then, whether the common names for diseases do indeed fulfill these cherished goals of clarity, non-ambiguity and avoidance of classical roots. Listed below are a number of common names for established human diseases:

**Ague**. A short, brief fever, tacitly malaria, from the French *fièvre ague*, which, in turn, is derived from the Latin, *febris acura*.

**Boil**. The word comes from an Old English word, *byl*, meaning swelling. The common medical term, furuncle, is from the Latin *furunculus*, meaning little thief. (The etymology of this is a mystery.)

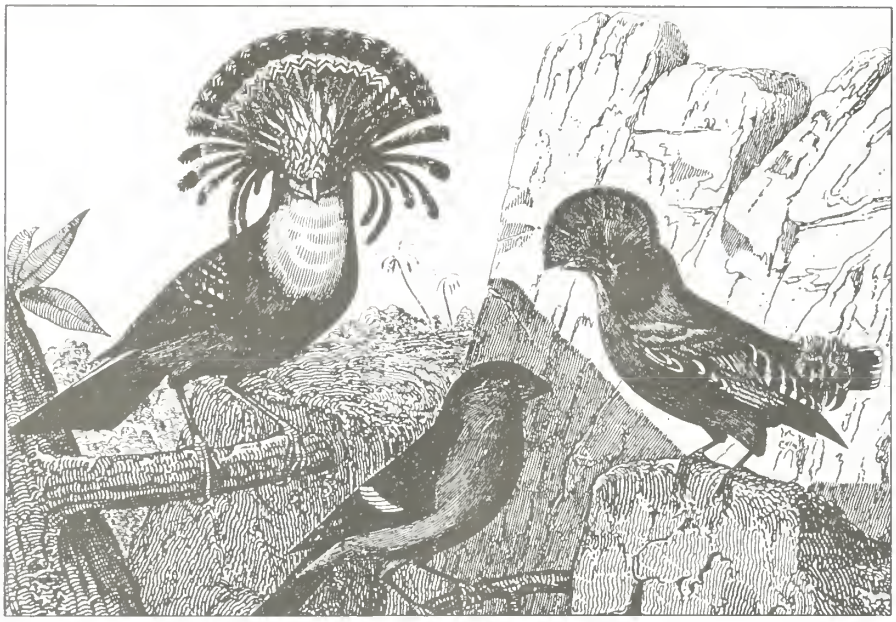
**Caries**. (as in dental caries). Named after Ker, Greek goddess of death.

**Cataract**. From the Latin *cataracta*, meaning waterfall or portcullis. Paré (1550) used cataract as a figurative description of lens opacity akin to a descending gate (portcullis).

**Chilblains**. From an amalgamation of the word chill with an Old English word, *blein* or *blegn*, meaning inflammatory swelling.

**Clap**. This word was probably named after the Middle Ages brothel district of Paris, *Clapier*, and originally signified any sexually transmitted disease. Only recently has the meaning been narrowed to gonorrhea.

**Consumption**. This common name



for any wasting disease, but particularly tuberculosis, has a Latin heritage in *consumere*, to spend or use up. In the 17th century, Bunyan says, "The captain of all these men of death was the Consumption, for it was that that brought him down to the grave."

**Dyspepsia**. A favorite diagnosis for the manufacturers of antacids. From the Greek, meaning badly cooked. In its early phases, this disorder is often mistaken for deep religious conviction.

**Flux**. A word describing dysentery, from the Latin, *fluxus*, meaning to flow. The synonym, runs, is from an Old Gothic term.

**Glands**. Describing neck swelling, probably of the cervical lymph nodes (from the Latin, *glans*, meaning acorn.) The word glanders, same origin, usually refers to a granulomatous disease of horses caused by *Malleomyces mallei*.

**Goiter**. From the Latin word *guttur*, meaning throat (see also, gutturral). The word carries no specific reference to the thyroid gland.

**Gout**. From the Latin, *gutta*, meaning drops; it derives from the curious notion that the disease represents some morbid humor dropping from the blood stream into the joint cavities.

**Leprosy**. From the Greek, *lepra*, meaning that which scales or peels off.

**Lockjaw**. A term of Old English origin. The medical term, tetanus, means a convulsive tension or a muscle stretch and is of Greek origin.

**Lumbago**. A lumbosacral backache, is derived from the Latin, *lumbus*, meaning loins.

**Migraine**. Originally, from the Latin *hemicrania*, (pain affecting one half of the head) which evolved into the word migraine when centuries of vernacular usage allowed the beginning and ending letters to atrophy. The word, megrims, meaning depression or blue feelings, is from the same source.

**Piles**. Derived from the Latin *pilea*, meaning balls, and named because of the racemose appearance of external hemorrhoids.

**Pox**. A common synonym for syphilis; the word is derived from an Old English word for a boil or discrete skin lesion. Originally, it was called great pox (to distinguish it from small pox). The word lues (sometimes, lues venera) also refers to syphilis. It derives from a Greek word (*luein*) meaning to set free or to spread, and has been used loosely to describe any plague. Syphilis (from the Greek, meaning a friend of swine) was a fictional shepherd lad in a 1530 poem by Fracastoro, the eminent Italian physician. He believed that the disease began in France and hence the name of his poem, *Syphilis sive de morbo Gallico*. Word manufacturers, like legislators, seem to recruit their most colorful prose when confronting something of a sexual nature. Syphilis economica, incidentally, is not a cheap infection but rather one transmitted by household articles such as towels (from the Greek, *oikos*, meaning household).

**Rheumatism**. From a Greek word meaning, that which flows, describing mucous membrane discharge, felt at one time to be a defluxion and the basis for rheumatism.

**Rupture**. An older word for an abdominal hernia; it comes from the Latin *ruptura*, meaning a tear or a break.

**Scrofula**. From the Latin, *scrofa*, meaning sows. The *ula* is a diminutive suffix. Why tuberculous lymphadenitis of the neck was thought to resemble little sows is obscure.

**Scurvy**. Derived from the Latin, *scorbuticus*, meaning to scratch or scrape. In Spanish, it is called *escorbuto* from whence words such as ascorbic acid are derived.

**Shingles**. A lay word for herpes zoster; it derives from the Latin, *cingulum*, meaning girdle, to describe the typical costal distribution of the skin lesions. The word zoster, incidentally, is from the Greek, and also means girdle.

It is hard to compress the etiology, clinicopathologic features and prognosis of a disease within a single word or phrase; yet this is the goal of those striving to give a name to an illness. Furthermore, the name should be allowed to undergo change as our insights into the illness deepen. The street word for this same illness, on the other hand, will frequently remain the same for centuries clinging to some small, often irrelevant, facet of the disorder. It is the difference between a vital definition and a quaint title.

To some, Latin is the reason for the fall of the Roman Empire; to others, it is the unifying language shared by scientists in all countries. It provides us with a rich menu of universally known roots, prefixes and suffixes and it happily condones our assemblage of new words. Most of the street names of common illnesses, sanctioned by centuries of common usage, moreover, also turn out to have their roots in Latin and Greek; but when they are examined etymologically, they bear little resemblance to the diseases they allegedly define. We should not be compelled, therefore, to employ a tart, inaccurate relic of a name rather than a more precise description merely because more people employ it.

Stanley M. Aronson, MD

## Anton Chekhov: Family Physician and Occasional Playwright

Anton Chekhov, Russia's foremost dramatist, was born in the northern Caucasus but one generation removed from serfdom. The time was 1860 and the birthplace was the shabby provincial town of Taganrog. His parents were barely solvent petty bourgeois merchants. His only mentor, during a harsh adolescence, was the school doctor who encouraged both his literary talents and his thoughts of a medical career.

In August 1879, Chekhov enrolled in the medical school of Moscow University. In the succeeding 4 years, he completed all of their academic requirements, provoking neither the wonderment nor the displeasure of an indifferent faculty. He graduated without event in 1883 and became the quintessential family practitioner: present at births, deaths and most intervening calamities; maker of house calls; counselor to despondent families; advocate of primitive public health measures; and committed worker during those many epidemics that afflicted the Russian peasantry with awesome regularity. During this decade he supplemented his income (he was now supporting his family) by writing numerous short stories and commentaries for literary weeklies. These prolific writings were certainly not memorable but were nonetheless sufficiently professional to earn him an income exceeding what he earned through his practice of medicine. In some years, as many as 129 of his sketches and stories were published.

Chekov's medical practice was conducted in urban Moscow, but he also provided medical care for the peasantry of some of the larger rural estates on the city's outskirts. Years later, he looked back upon his clinical experiences and judged himself to be an adequate family physician capable of meeting the medical needs of those "entering or leaving this world." His greatest challenges were the inevitable waves of typhus, cholera, typhoid and diphtheria that tempered the lives of those recently emerging from serfdom. Chekhov thought himself to be about as proficient as the university professors, which is to say that he could offer neither more nor less than they to stay the natural trajectory of these scourges.

The final decades of the 19th century saw considerable political ferment in Tsarist Russia, much centered in the universities. Chekhov neither participated in this unrest (in contrast to most of his contemporary writers) nor even acknowledged the existence of revolutionary turmoil in any of his five great dramas.

Colleagues of Chekhov described him as a modest, painfully shy, self-effacing person who, nevertheless, was endowed with a happy disposition and a gregarious personality. Beyond 1887, he invested his energies into his dual roles as physician and writer ("my two mistresses"). His writing of dramas was fitfully undertaken between clinical responsibilities. Chekhov's first major play, *Ivanov*, was staged in Moscow in 1887 and was deemed a qualified success.

While laboring on his second play, *The Seagull*, Chekhov's health deteriorated. He experienced a massive pulmonary hemorrhage secondary to his tuberculosis, was required to relinquish his medical practice and travel to southern France to regain his strength. When he returned to Russia he began a memorable and mutually productive association with the newly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formed Moscow Art Theatre (directed by Stanislavsky), which continued until his death 14 years later.

The dramatist's last few years were spent in the warmer Crimean climate, but he did venture north for the Moscow premieres of *Three Sisters* and *The Cherry Orchard*. In 1901, Chekhov married the great Russian actress, Olga Klipper. It was a tragically brief marriage; Chekhov died on the night of July 1, 1904, at age 44.

The dramas of Chekhov are difficult to describe: little momentous action takes place beyond an occasional infidelity, the acknowledgment of a birthday, or a contentious but nonviolent dispute; a rare suicidal act, as in *The Seagull* is assigned to an off-stage site. The single most dramatic event in Chekhov's plays, said one critic, was the setting of the sun. His characters are virtually all middle-class who experience satisfactions rather than ecstasies and rueful disappointments rather than abject despondencies. The plays have been described as extended (some say interminable) conversations leading to yet further conversations. The settings are almost always within the family home, each member more or less hostage to a lifetime of constraints, conflicts and aborted possibilities. None of the plays present the viewer with a clean resolution of the problems. One leaves the theatre with the feeling not of having watched a drama but rather of having been allowed to sit for a short and unobserved interval observing a family attempt to cope with their unique realities. The genius of Chekhov is in the details of dialog: the subtleties of voice, the ennoblement of life's trivialities. Chekhov once observed: "A play should be written in which people arrive, go away, have dinner, talk about the weather, and play cards. Life must be exactly as it is, and people as they are." There is neither poverty, hunger, wars, social injustice nor revolution in Chekhov's dramas; nor, on the other hand, is there fantasy or imaginative whimsy. Humor goes no further than ironic commentary. The dramas are nothing more than brilliantly distilled realism.

In each of his dramas but the final one, Chekhov inserts a physician as a major character. These physicians are no more heroic than their patients or friends, but they display substantially more insight and vastly more tolerance for human imperfection. Often, they are in the midst of a house call that extends through all four acts. As a group, Chekhov's physicians are asthenic, lonely, somewhat passive, filled with ennui, unmarried, and resigned to the grand design of life. They have little faith in the effectiveness of their prescriptions or the capabilities of their peers. They view the imponderable questions of life with irony, bemusement or submission.

A sense of profound fatigue permeates these great dramas. In *Uncle Vania*, Astrov (a physician) and Voinitsky hold the following exchange:

ASTROV: Tell us something Ivan Petrovitch.

VOINITSKY (listlessly): What do you want me to tell you?

ASTROV: Isn't there anything new?

VOINITSKY: Nothing at all. Everything's old. I'm just the same as I was-perhaps worse, because I've grown lazy: I don't do anything, I just grumble. . .

Perhaps the world-weariness and lassitude in Chekhov's dramas reflects a late 19th century world uneasy with itself; perhaps it is the voice of a physician who has experienced too much; or perhaps it is only the râles of Chekhov's own tuberculosis intruding on life's more joyous noises.

Stanley M. Aronson, MD

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# Family Medicine: A Small Vignette

Esther Entin, MD

***For a few hours, I sat in the living room amid grieving relatives and swaying clergy while Lisa lay dying on a fold-out couch.***

When my husband, Steve, was a National Health Service Corps doctor in a small midwestern town, I worked part-time as a pediatrician. Frequently, we'd each care for different members of the same family. Sometimes it took our combined knowledge as pediatrician and family practitioner, as well as our divergent practice styles to care for our families. Together we developed our own definition of "Family Medicine."

Seven-year-old Lisa Brown came from a large household filled with abuse, neglect, infidelity and barefoot-tooth-rotting poverty. She had Down's syndrome and she had leukemia. She had reached the end of the line with the city specialists and had returned to die in her chaotic home. Her mother, Cheryl, was Steve's patient, and through Steve's introduction, Lisa became mine.

I saw Lisa every Wednesday afternoon, managed her manageable medical problems, chatted with her mother about vitamins and wondered when she'd die. One Wednesday she was pale and tachycardic, clearly anemic, clearly changing, clearly not going to recover. Her mother and I talked. For the millionth time, I explained the futility of vitamins with iron and recommended against a palliative transfusion. We agreed that this was the beginning of the long awaited end. They left, but within a half an hour, I received a call, my first contact, from Lisa's wayward father, Tommy. He was frantic; he was irate. He didn't want to hear from some woman he'd never met that his daughter was dying and that we had best let her be. He demanded a transfusion. I explained. He ranted. I explained some more.

He ranted some more. We got nowhere. He refused to come in and talk with me but finally offered a coherent plea: Would I please call Lisa's original oncologist in Springfield.

"She knows her," he pleaded. "Just ask her whether she should have a transfusion."

I agreed willingly, so relieved to share the burden of pronouncing someone "dying." As I expected, the oncologist was adamantly opposed to a transfusion. She gave me some key phrases to use with Tommy.

"He'll know I'd put it that way," she said. She was kind and supportive.

She was complimentary of my care of Lisa. And she was worried-not about Lisa-but about me.

"Mr. Brown is a volatile person," she said. "When Lisa dies, he will probably react violently. He will become psychotic. He's done it before when she has relapsed. He may try to kill you. Call the police," she cautioned. "Tell them you have a potentially psychotic man who is going to blow up. And BE CAREFUL."

Before calling the police, I called Steve. I told him the story and the warning I had received and how scared I was. There is no place to hide in a town of 5000. I wondered what to do. The family doctor in Steve took an approach that the threatened pediatrician in me had not considered. Both Cheryl and Tommy were Steve's patients. He felt he knew them well.

"Call them back," he told me. "Ask them if we can come over to their house and talk."

And that's what we did. We sat in their living room where they felt safe and in control. We were guests more than we were medical authorities. Our visit gave their marriage more credibility than they had ever given it themselves. We talked about their pain, their fears and their grief—maybe not in so many direct words but we all knew what was being said. To my amazement, Lisa's father sat with us and cried.

A few nights later Cheryl called. "Please come right away" was all she said, and I ran out the door.

For a few hours I sat in the living room amid grieving relatives and swaying clergy while Lisa lay dying on a fold-out couch. I didn't do much. In my Saturday night blue jeans, T-shirt and sneakers, I went unrecognized as a doctor to all but Tommy and Cheryl. One of Lisa's younger siblings climbed into my lap every now and then, and we speculated together about heaven.

When Lisa arched and drew a final agonal breath, her family frantically wrapped afghans and blankets tightly around her as if they could prevent her life's warmth from escaping. I didn't have the heart to invade their cocoon with my stethoscope to make some doctorly confirmation of death. I just sat and watched for quite a while longer—not at all threatened, but comfortable, in the living room where Steve and I had shared some family medicine.

*Esther Entin, MD, is a clinical assistant professor of family medicine, Brown University, and an attending physician at Memorial Hospital of Rhode Island, Pawtucket.*

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# Family Medicine: A Journey Beyond the "Chief Complaint"

Tina M. Kenyon, MSW, LICSW

*The family physician develops relationships with all members of the family and sees them across the life span from birth to death.*

***"It is as if doctors and patients have a covert agreement that physical symptoms are the only legitimate tickets of admission to a doctor's office. Patients who are ready to say more, often find their comments cut short by a doctor's asking where the pain is, whether it is sharp or dull rather than asking about the circumstances, personal and social, in which it occurs"***[1]

As patients attempt to take a more active role in their medical care, many are seeking a more humanistic approach from their physicians, as the biopsychosocial model proposed by G.L. Engle illustrates. This model suggests that when diagnosing and treating the patient, the physician must consider not only the biological aspects of the disease, but also the psychosocial context within which the disease is embedded, including the family, community, and culture.[2]

Cousins, in his research on the physician-patient relationship, noted that 85% of participants had changed physicians, or had considered it within a 5-year period.[3] Many changed because of their physician's poor communication skills. The importance of relating effectively to patients is recognized by some malpractice insurance carriers who offer lower premiums to providers who receive additional training in interacting with patients. This reflects the belief that litigation is less prevalent when the patient and provider have a high quality relationship. Many medical schools and residency programs have recognized that a solid fund of knowledge and sound clinical judgment are not the only elements required for a student to become a "good doctor." Rather, students must also develop the ability to elicit a complete history and to understand what messages the patient is sending verbally and non-verbally. The future physician should also become adept at exploring the patient's view of the illness as well as initiating effective patient education.

The specialty of family medicine, by virtue of its orientation toward this patient-centered approach, has a distinct advantage in providing health care. The family physician develops relationships with all members of the family, and sees them across the life span from birth to death. This context provides a wealth of information about the patient's cultural, psychological, social, economic and biological functioning over time. These on-going relationships also foster trust, continuity, and often adherence to treatment plans that otherwise may be ignored. The woman who is embarrassed to admit that she is being beaten daily in her own home, the elderly man who is silently concerned about his memory loss, and the adolescent who can't discuss birth control with her mother will be more likely to discuss these sensitive topics with a physician whom they have identified as supportive and non-judgmental.

***. . . our challenge is to offer practical approaches to patient care that are both clinically relevant and creative.***

Most patients seek a quality relationship with a provider who will listen, be empathic, and demonstrate a willingness to treat them as whole people, not merely focusing on the physical "chief complaint." For example, a patient in our practice recently told us of a visit she made to a medical specialist. Because of several losses in her life, she was depressed and intermittently tearful. She managed to control her tears through most of the visit but then involuntarily began to cry. The specialist's reaction was to say, "I am not the 'right' kind of doctor for that (meaning her sadness), you'll have to discuss it with your family doctor," and he proceeded with the examination. Fortunately, because the family physician views patients in their psychosocial framework, they are more responsive to factors affecting health and the complexities of an individual's life. The family practitioner also recognizes the critical role of the family and its impact on how the patient copes in times of health and illness. Particularly with regard to chronic illness, the family can be the physician's greatest ally in helping the treatment process flow smoothly. If everyone involved understands the plan, this can reduce the number of contacts needed to share information, thereby saving time for all concerned.

Another important contribution family physicians make to the treatment of patients comes from their own professional and personal experiences. When providers draw appropriately on all of their resources, it can add another positive dimension to the relationship.

One such recent case involved a 54-year-old man who was brought into the emergency room after suffering a massive myocardial infarction. Despite his daughter's immediate response in rendering cardiopulmonary resuscitation and the best efforts of the emergency room team, the man died. For a moment, the resident physician who was involved felt as though this could be his own 54-year-old father and that he could be informing his siblings about this tragic event. Through this momentary awareness, he was able to present the information sensitively and clearly, to reinforce the daughter's effort, and to share their grief in a supportive way. As this situ-

*Tina Kenyon, MSW, LICSW, is a clinical teaching associate and academic social worker in the Department of Family Medicine, Brown University.*

ation illustrates, the quality of empathy derived from the family physician's self-awareness blended with strong intervention skills may greatly enhance the success of the encounter.

How can the medical education system prepare physicians to provide sensitive care that is also scientifically and medically sound? Clearly, a balance of biomedical and psychosocial skills must be integrated in the preparation of a practicing physician. In studies of general practice, the frequency of diagnosable psychiatric disorders (including depression) ranges from 11% to 36%.[4] According to US National Center for Health Statistics, there were 692 million visits to physicians' offices in 1989. Using the 11% frequency figure, that translates into more than 75 million patient-physician encounters involving a psychiatric component. Thus, if primary care physicians are to offer comprehensive and effective treatment, they need to develop competence in addressing the psychologically and socially based components of the patient's presentation.

***The importance of relating effectively to patients is recognized by some malpractice insurance carriers who offer lower premiums to providers who receive additional training in interacting with patients.***

Standards for such competence have been established for family physicians by the Accreditation Council for Graduate Medical Education of the American Medical Association. "The curriculum must identify a psychiatry training component which encompasses recognition, diagnosis, and management of emotional and mental disorders along with and/or as components of organic diseases."[5] In addition, family dynamics, epidemiology, physician self-awareness, community medicine, human development, behavioral counseling, and the physician-patient relationship are identified as crucial to the training of family physicians.

Opportunities to gain perspective on the various psychosocial elements of medical care delivery are offered through small group interactive discussions, didactic sessions, conferences, research projects, and presentations generated by the learners themselves. Specifically, we provide a course designed to review principals of sound medical interviewing for first year residents. During a session of visits with their continuity patients, all residents have access to faculty mental health professionals who consult regarding intervention strategies and appropriate resources in the community. Second and third year residents learn through visits to patients' homes and nursing homes, accompanied by physician, nurse practitioner and social work faculty members. Residents work with faculty to design elective experiences in a specific area of interest to them, such as family therapy. As medical and mental health professionals training future primary care physicians, our challenge is to offer practical approaches to patient care that are both clinically relevant and creative.

The training of family practitioners must prepare them to deal with a wide range of situations requiring a variety of skills and knowledge. An elderly man living alone complains of indigestion, though he is truly concerned about his declining ability to care for himself. A child presents with vague abdominal pain that seems to get worse in the evening, a time when his parents frequently fight. A young woman makes an appointment to discuss birth control, and during the pelvic exam, reveals history of being sexually abused as a child. A single parent visits her physician with headaches, and admits to feeling so stressed that she has thought about hurting her children. A middle-aged man wants a "cure" for his fatigue and malaise, when in reality, his alcohol consumption has brought him close to losing his job and family. When physicians focus exclusively on physical complaints and do not explore other contributing factors, their efforts can be largely ineffective. If the physician can assess beyond the presenting symptoms, and discover the true cause of the patient's distress, those they treat can benefit from an enhanced quality of life. Also, health-related comorbidities associated with coping difficulties can be minimized or avoided through early intervention. In addition, the family physician has more opportunities to encourage patients to engage in preventive behaviors that can have many long term benefits, instead of merely responding to symptoms. This longitudinal approach is a unique advantage available to primary care physicians, who follow the biopsychosocial changes in the lives of those for whom they care.

***When physicians focus exclusively on physical complaints and do not explore other contributing factors, their efforts can be largely ineffective.***

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The duty of the psychosocially oriented faculty is to assist physicians to develop the necessary skills to be effectively responsive, within the constraints of the average office visit of 10-15 minutes. For example, basic counseling skills, when successfully woven into the fabric of the patient visit, can contribute a great deal in several respects:

- **Stronger rapport in the doctor-patient relationship**: The patient develops trust in the provider, and the physician is viewed as a supportive person in the patient's life.
- **Modeling effective communication**: Patients learn over time how to verbalize their needs in more appropriate ways and to work with the physician instead of being dependent on him or her.
- **Empowering patients to affect their own destinies**: Assisting with information about preventing illness, helping patients make decisions through choice, and enlisting the participation of the family in support of the patient.
- **Helping patients to prevent translation of emotional pain into physical symptoms**: Listening, offering resources that can be helpful in their lives outside the physician office visit, and listening.

The family physician, skilled medically in common issues that occur at all life stages, can also contribute empathy, support and guidance to the patient encounter.

***If patients and physicians can participate equally in health promotion, prevention of illness and early treatment, the benefits are numerous.***

If patients and physicians can participate equally in health promotion, prevention of illness and early treatment, the benefits are numerous. The time, money and energy expended in the interest of health care can be used more effectively through the efforts of well-trained family physicians who view patients as unique individuals and interact with them and their families accordingly. Other medical specialties can learn a great deal from the tenets of family medicine. The journey beyond the "chief complaint" leads toward treating people respectfully in their family, cultural, and community context, the true art of medicine.

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# The Memorial Hospital/Brown University Residency Training Program in Family Medicine

Stephen W. Davis, MD

***The department has developed a reputation for being concerned about the care of the underserved.***

The Department of Family Medicine of Brown University was located at The Memorial Hospital of Rhode Island for several reasons. In the late 1960s Memorial Hospital had approval for a general medicine residency and had an institutional commitment to general practice training; however, the general medicine residency at that point was almost dormant. As Francis Dietz, who became the hospital president in 1966, began to consider the needs of the institution, the community, and the need to improve and expand the medical capabilities of the hospital, he became aware of the growing movement in family medicine.

Family medicine had become a specialty recognized by the American Board of Medical Specialties on February 8, 1969. After visiting several of these newly formed family medicine residency programs, Dietz and others felt that such a program might be appropriate for Memorial Hospital, the Pawtucket community, and compatible with the Brown University plan for medical education. There then ensued consideration between the hospital and the medical school concerning the nature of this new type of residency and its relationship with the developing medical school.

The associate dean of the medical school, Dr David Greer, joined the effort at Memorial as the chairman of Family Medicine. He and Dr John C. Cunningham, a local Pawtucket general practitioner, and a few part-time preceptors, became the faculty for the residency. The program began in July 1975 with eight first-year residents, and the following year 12 new first-year residents were recruited. The first residency graduation was in 1978 with seven new family doctors, and the following year there were 11 graduates. Since then there has been a complement of 12 residents per year, and the graduation rate has been close to that goal. In 1978, Dr Louis Hochheiser became chairman of the department. Since 1987, Dr Vincent Hunt has directed both the department and the residency training program.

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***The initial ambulatory patients for the residents were derived from Dr John Cunningham's private practice.***

A few words about Dr John Cunningham: The initial ambulatory patients for the residents were from Cunningham's private practice. He had invited his patients to continue their care with him and his new colleagues at the Family Care Center at Memorial Hospital. This benefited the residents in several ways: It allowed them to join an on-going practice with diverse patients at various stages of their medical care. It also allowed the residents to have as their role model a man who had been a family doctor, a member of the medical staff, and a pillar of the community for years. Cunningham seemed to know everyone in Pawtucket, everything about them, and all their relatives. (And if he didn't, his office nurse, Joyce Lynch, did.) Not only did the residents have a role model in Dr Cunningham, but, by assuming the care of his former patients they immediately became immersed in the phenomenon of being family doctors. The diligent supervision that Drs Cunningham and Greer provided those first few years of the residency contributed greatly to the success of the program.

As the residency gained momentum and prestige both locally and nationally and as more faculty were added, Cunningham's concerned and common sense approach to patient care and to resident supervision continued to be a hallmark of the program. His caring and encouraging manner made it possible for our residents to become capable and compassionate physicians. Until his death in 1988, Dr Cunningham was the primary influence on a decade of training family doctors.

The 3 years of residency education in Family Medicine were patterned after the guidelines of the Residency Review Committee of the Accreditation Council on Graduate Medical Education. The training curriculum at Memorial Hospital has varied slightly through the years but generally has included about 12 months of inpatient medicine, intensive and coronary care, and emergency room experience, 6 months of pediatric experience, 4 to 6 months of surgical and surgical subspecialty experience, 4 to 6 months of obstetrical and gynecological experience, and about 4 months of electives. The hallmark of family medicine training is the emphasis on ambulatory activity. During the 3 years of training, the residents spend from 1 to 4 half-days per week seeing their own ambulatory patients in the Family Care Center. Recently, the Blackstone Valley Community Health Center in Central Falls has become the primary ambulatory site for six of the residents. When the residents' ambulatory patients need to be admitted to the hospital, the residents are expected to participate in their inpatient care. Their ambulatory and inpatient care includes obstetrical patients as well. At present the residents are involved with about 650 to 700 Family Care Center and health center obstetrical patients per year.

Family medicine and, consequently, family medicine residency training is substantially more than an extended rotating internship: One of the key facets of family medicine is the approach to the patients, which includes considering them and their problems

in the context of their family and community. Family medicine must be sensitive to the psychosocial and behavioral aspects of the patient's needs. The behavioral sciences are not taught in month-long rotations in our residency, but rather are incorporated throughout the residency training in various capacities: ambulatory precepting by family doctors, a noontime on-going lecture series, a patient videotape-based seminar for third-year residents, and by psychological and psychiatric consultation on their own patients in the Family Care Center.

## Survey Results

In 1989 the department conducted a survey of its graduates to determine the nature of their current professional activities. From 1976 to 1989, 134 graduated from the Brown University family medicine residency training program, and 72 (54%) returned questionnaires. The responses demonstrated a wide diversity of practice settings and styles. Although nearly half of the questionnaires were not returned, a review of the non-responders suggested that their practices were similar to those who responded.

The responses demonstrated that family medicine is both a rural and an urban activity. Four (5.6%) of the respondents work in towns of less than 2500 population. Twenty-one (29.2%) work in towns up to 25,000 population. Sixteen (22.2%) work in small cities with 25,000 to 50,000 people. Thirteen (18.1%) work in cities up to 100,000 population, and 15 (20.8%) work in cities over 100,000.

***Family medicine and, consequently, family medicine residency training is substantially more than an extended rotating internship.***

The types of practice arrangements varied a great deal as well. Table 1 shows the percentages for the responses to each category. Note that since the categories are not mutually exclusive the percentages add to more than 100%.

In the "Other" category were comments about additional activities that these family physicians were undertaking along with their practices or further definitions of their practices. These comments included "city health officer," "part-time associate medical school dean," "neighborhood health center," "nursing home contract with salary," "Indian Health Service," "ambulatory care facility," "state department of health employee," "community private, non-profit clinic," "owner and operator of 6 walk-in clinics," and "fellowship in academic family medicine." Interestingly, all of the "Other" responders were actively involved in family medicine in some capacity.

Table 1.—Practice Arrangements: Family Medicine Residency Graduates

| | |
|---|---|
| Fee for service | 33.3% |
| Salaried | 43.1% |
| Solo | 19.4% |
| Partnership | 9.7% |
| Single specialty group | 13.9% |
| Multi-specialty group | 16.7% |
| Health maintenance organization | 27.8% |
| Full-time Family Medicine faculty | 6.9% |
| Military | 1.4% |
| National Health Service Corps | 2.8% |
| Emergency Room | 6.9% |
| Other | 19.4% |

Of the 72 respondents, 67 were involved in direct ambulatory care. Of those, 98.5% were seeing adult medical patients, 98.5% were seeing pediatric patients, 23.5% were seeing obstetrical patients, 91% were seeing gynecological patients, 53.7% were seeing surgical patients, and 52.2% were seeing trauma patients in their practice. Adult medical patients accounted for 49.9% of the ambulatory patients seen, ranging from 10% to 100% of each practice. Pediatric patients accounted for an average of 23.4% (range: 5% to 50%). For the 16 doctors in the sample who were seeing obstetrical patients, their maternity patients accounted for an average of 18.3% of their practices (range: 1% to 70%). It is worth noting that two of the respondents had finished 1-year fellowships in obstetrics. Gynecology accounted for 15.0% of the practice for the 61 physicians who were seeing gynecological patients (range 2% to 30%). Surgical patients accounted for an average of 5.8% of the patients for the 36 doctors seeing ambulatory surgical patients (range 0.5% to 20%). Trauma patients accounted for 11.2% of the practice for the 35 doctors who saw trauma patients (range 0.5% to 60%). There may have been some confusion about whether emergency room patients counted as ambulatory patients in the responses.

Forty-six of the 68 doctors (67.6%) answering the question reported that they make house calls.

A review of the 167 graduates of the residency program whose current addresses are known demonstrates that 68 are working in Rhode Island or nearby Massachusetts and Connecticut. Twenty-five are working elsewhere in Massachusetts, and 20 are working elsewhere in New England. The Brown University/Memorial Hospital Family Medicine residency is having a growing impact on the medical care of southern New England with nearly 100 graduates practicing in the area.

## Hospital Privileges

There are various practice models for family practitioners concerning hospital privileges. Most American family physicians have hospital privileges; some restrict their activities to the ambulatory arena and, when patients need to be admitted, they refer their patients to a colleague. Several of our residency graduates work in outpatient settings such as emergency departments, urgent visit units, or isolated rural settings where hospital privileges are unnecessary or impractical. Fifty-five of the 69 respondents to this question do have hospital privileges. Thirty-four of those 55 reported no restrictions on their privileges. Of those with privileges, 84% have internal medicine privileges; 55% have pediatric privileges; and 15% have obstetrical privileges. Family physicians who practice obstetrics do not customarily do "high-risk obstetrics, and they do not perform Cesarean-sections, although some who have completed fellowships in obstetrics and those in very rural areas often have Cesarean-section privileges. In many hospitals with family medicine departments, "Family Medicine" privileges rather than privileges in individual depart-

ments are awarded to family practitioners. This phenomenon may modify the above percentages.

The average daily inpatient census for our graduates with each type of privilege is as follows: medicine, 6.2 patients; pediatrics, 1.5; and obstetrics, 2.0. Our graduates also see an average of 6.7 nursing home patients per week, 1.3 home-bound patients per week, and 15.2 emergency room patients per week, although this last number is biased greatly by a few full-time emergency room physicians among our graduates.

## Recent Graduates

A further review of the activities of the 47 more recent graduates of the last 3 years (1990-92) demonstrates some new trends. These trends are partly a result of the increased cost of medical education and partly a response to influences of our departmental faculty.

Of the 47, two are not currently employed for health or personal reasons. Two others are participating in Maternal and Child Health fellowships here at Memorial Hospital, in conjunction with the Blackstone Valley Community Health Center. Of the 43 remaining graduates, 16 are employed by community health centers and 5 by the Indian Health Service. The remaining 22 are primarily in private practice, a few are employed by health maintenance organizations, 1 emergency room, and 2 have assumed faculty posts in family medicine residency programs.

This trend towards working with the underserved is primarily the result of two factors. Many of our residents graduate with a significant debt burden from college and medical school. The recent government loan-repayment program for primary care providers who work in underserved areas has been an incentive for our graduates. Nevertheless, they would probably not choose to work in those locations if they were not so inclined. The department has developed a reputation for being concerned about the care of the underserved. Our chairman, Dr Vincent Hunt, and recent residency directors, Drs Patrick Dowling and Alicia Monroe, have established this orientation for our department. Our close working relationship with four local health centers demonstrates this commitment. We have attracted residency applicants who have been interested in the care of the underserved.

During the past 3 years, there has been a trend for the graduates of our program to do more obstetrics in their practices. The percentages and numbers of recent graduates doing obstetrics follows:

| Class Year | Number | Percentage |
|---|---|---|
| 1989 | 4 | 33% |
| 1990 | 9 | 75% |
| 1991 | 6 | 60% |
| 1992 | 6 | 55% |

These numbers include the two graduates doing the Maternal and Child Health fellowship. This trend to engage in obstetrics is also based on two major factors: (1) primary care of the underserved is optimized by the inclusion of obstetrics in a family-centered practice; and (2) the greatly improved training in obstetrics that our residents receive encourages them to do deliveries with confidence. The latter factor has been the result of several components: the improved quality of obstetrics at Memorial Hospital; the coordination of the residents' obstetrical training and care delivery by a fellowship-trained family medicine faculty person, Dr Brian Jack; the formation of the Blackstone Valley Perinatal Network under the leadership of Dr. Larry Culpepper; and our close association with the Blackstone Valley Community Health Center organization.

One other obstetrics-related trend has occurred among our recent graduates: They have had babies themselves. Twenty-six of the 47 recent graduates are women. At last count 11 have had babies during residency or soon after, and 1 has adopted a baby. Of the recent men residents, 9 have recently become fathers.

This review of the Memorial Hospital/Brown University residency program in Family Medicine and its graduates suggests that our graduates are able to do what they intended to do: they are taking care of people, from prenatal care to geriatrics. They are coordinating care with specialists; they are admitting people to the hospital, even to intensive care units; they are delivering babies (more than they were 10 years ago); they are taking care of children, adults, and the aged. They are the specialists in primary care that they were trained to be.

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# Family Medicine Obstetrics

Brian Jack, MD
Larry Culpepper, MD, MPH
Martha Carlough, MD
Stanley Warner, MD, PharmD

***... in the United States, more than 200,000 babies are born each year to mothers who do not receive timely, adequate prenatal care.***

The debate involving the role of obstetrics in family practice has intensified in recent years. A continuing series of reports document the decreasing numbers of family physicians who practice obstetrics. The most recent Academy of Family Practice Survey shows that 28% of academy members practice obstetrics - down from 41% just 5 years ago.[1] The reasons family physicians give for dropping obstetrics - high malpractice insurance premiums, an increasing reliance on technology, difficulty in keeping current, and lifestyle issues such as disruptions in practice time and interference with family life - are all well publicized.

The justifications to continue obstetrics as part of family practice residency training emphasize the role of the family physician in humanizing the delivery experience through family-centered maternity care and show that family physicians have equally positive outcomes with less obstetric intervention and more patient satisfaction than do obstetricians.[2-4] The role of the family physician in providing comprehensive primary care to the expectant family has not been emphasized. This paper reviews the expanded role that the family physician can play in addressing critical needs in our maternity system. These issues are important when discussing career options with medical students who plan careers in primary care but do not want to deliver babies, and with primary care curriculum planners who consider excluding obstetrics as part of core primary care training.

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## The Perinatal Paradox

Maternal and child health (MCH) indicators are deteriorating at a time when health expenditures are increasing.[5] The United States spends more per capita on personal health care than any other country and leads the world in medical technology. Yet the national infant mortality rate ranked 22nd in the world in 1989.[6] The US did not meet the goal set for 1989 of 9 deaths per 1000 live births, a goal that was met by 19 other nations, including Spain, Ireland, and Singapore. This situation among certain populations is even more disturbing. Among black infants, the 1988 mortality rate was 17.6 deaths per 1000 live births, more than twice the rate for white infants. Had the black infant mortality rate been as low as the white rate over the past half century, more than 400,000 babies would have lived.[7-9]

The situation is similar with low birthweight, which is one of the surest predictors of infant death or long-term disability.[10] Countries with significantly lower infant mortality rates, such as Japan and Sweden, have low birthweight rates that are approximately half the US rate. Unless the proportion of US babies born with low birthweight is reduced, the United States will retain its relatively poor international infant mortality ranking. However, progress in reducing low birthweight is at a virtual standstill. In 1988, 6.9% of all babies were born at low birthweight - a slight increase over 1980 levels.

Furthermore, in the United States, more than 200,000 babies are born each year to mothers who do not receive timely, adequate prenatal care.[7] Some women are unable to find prenatal care until the last weeks of pregnancy or go without prenatal care altogether. In 1988, the proportion of US births to women receiving prenatal care during the first 3 months of pregnancy was 75.9%, the same as in 1979. The proportion of babies born to mothers who received late prenatal care (after the sixth month of pregnancy or not at all) either worsened or failed to improve for 9 consecutive years, and in 1988 was nearly 20% higher than 1979. Prenatal care rates are particularly low for black, native American, Hispanic, poor educated, and teenage mothers — those most likely to be poor and without health insurance.[7] In addition, there has been a dramatic decrease in access to prenatal care in many rural areas of the US, and recent studies demonstrate that increasing the distance a woman must travel for care increases the proportion of complicated deliveries and prematurity.[11,12]

## What Can Be Done?

A series of expert groups has convened in recent years to study and suggest ways to improve our national MCH indicators. In general, they suggest primary care be emphasized as an integral component to our maternity system in addition to the excellent technical care provided in regional centers (tertiary prevention), and the systems of detection and treatment (secondary prevention) already available in many communities.

In 1983, the Institute of Medicine (IOM) convened an interdisciplinary committee to study the causes and prevention of low birthweight.[13] The committee concluded that the preven-

***ABBREVIATIONS USED***
***IOM: Institute of Medicine***
***LBW: low birthweight***
***MCH: maternal and child health***
***NHSC: National Health Service Corps***
***WHO: World Health Organization***

tion of LBW requires providing early and continuous prenatal care. Groups at particular risk for suboptimal prenatal care must be identified and more adequate prenatal care be made available. The IOM report recognized that behavioral, social, and cultural factors influence perinatal outcome. They suggested that greater emphasis be placed on identifying and reducing risks before pregnancy and that early and regular prenatal care be accessible and be made sufficiently flexible to meet the needs of both high and low risk women.

***Among black infants the 1988 mortality rate was 17.6 deaths per 1000 live births, more than twice the rate for white infants. Had the black infant mortality rate been as low as the white rate over the past half century, more than 400,000 babies would have lived.***

In a follow-up publication,[14] the IOM identified lack of access to prenatal care as an important precursor of low birthweight. They subsequently identified six major reasons for obtaining inadequate prenatal care: financial constraints including inadequate insurance or public funds; inadequate availability of service providers, especially providers wilting to serve socially disadvantaged or high-risk women; insufficient prenatal services; practices and atmosphere of prenatal services, and cultural and personal factors. They recommended expanding training of personnel to improve the accessibility of early and regular, high quality prenatal care for all women.

In 1989, the US Public Health Service Expert Panel on the Content of Prenatal Care[15] emphasized the need to place greater emphasis on identifying and reducing risks before and during pregnancy. They defined three components of prenatal care to include: (1) early and continuous risk assessment, (2) health promotion, and (3) medical and psychosocial interventions and follow-up. They suggested that the standard obstetric measures obtained in most prenatal care providers' offices explain only a small proportion of the variability of pregnancy outcomes and that descriptors of a mother's psychosocial situation are significant predictors of pregnancy outcomes. They emphasized that prenatal care should add to the traditional medical concerns a new emphasis on the psychosocial dimensions of care. Often, these can be addressed through preconception and early prenatal intervention. The panel defined three categories of psychosocial risk: social factors, psychological factors and adverse health habits. Further, they emphasized that the primary provider must develop an integrated plan for care that addresses these risk categories and a woman's needs in a manner that is perceived as useful, supportive and caring.

In 1990, the US Commission to Prevent Infant Mortality[16] studied the problem of US infant mortality and stated that 10,000 deaths could be averted annually and 100,000 of the 400,000 infants left disabled each year could be spared simply by applying current knowledge. They stated that there must be no financial, geographic or administrative barriers so that every mother and every baby can obtain the health care they need. Further, they suggested that early care of high quality and appropriate to the health risks present must be provided.

The World Health Organization (WHO) identified the lack of organized and comprehensive, community-based MCH services as unique to the US among developed countries.[17] They observed that in no European country do obstetricians provide the primary care for most women with normal pregnancy and birth. They suggested that United States: (1) expand prenatal care, (2) develop programs for maternity protection (3) add a new dimension of primary health care to our maternity system and; (4) unite the medical and social approach to further develop services during pregnancy.

Common among the recommendations resulting from the deliberations of these various expert groups is a call for low technology, high-continuity interventions. We must lower barriers to prenatal care, provide comprehensive, expanded and organized prenatal care, and emphasize risk reduction and health promotion activities. There is growing recognition in the United States that the problems of infant mortality, low birthweight and associated morbidity, and problems of infancy associated with poverty require the development of comprehensive, interactive and preventive community-based MCH programs. Currently, in the United States, we have the tools to lower infant mortality; we simply must get the care that we know how to provide to those who need it.

## Role of the Family Physician

What is the role of the family physician in addressing these concerns? There are several ways that the skills of a well-trained family practitioner can be utilized to fill unmet needs in our maternity system. Among these are providing (1) access to prenatal care, (2) enhanced, comprehensive, and community-based MCH services, (3) risk reduction and health promotion activities, (4) preconception care, (5) family-centered maternity care, and (6) a mix of services in community based settings that result in cost savings.

***Rural areas are almost totally dependent on family physicians for care.***

**Access to Prenatal Care:** Urban and rural, minority, low income communities with the highest incidence of low birthweight, preterm labor and other adverse birth outcomes frequently have shortages of prenatal care services. This past decade has seen an ever-widening gap between those members of society who have access to adequate health services and those who do not.[17] More than 30 million Americans live in areas considered medically underserved by the US Public Health Service. While gaps in health insurance coverage are growing in the United States for everyone, the problem is especially acute for women having babies. Two-thirds of this population are women of child-bearing age and children.[18] This is largely due to the fact that these women tend to fall into those age and income categories most likely to be without coverage.[19]

Recruitment of clinical staff in underserved communities is especially

difficult because of the shortage of obstetrical providers nationally. The long-term shortage of primary care providers was compounded by the reduction in the National Health Service Corps (NHSC) funding during the 1980s. In addition, some physicians are unwilling to work with low income clients, multiple problem clients, low salaries, large caseloads and poor working conditions. Contributing to the lack of access of women and children to providers is the declining rates of private insurance coverage, the inadequate public sector insurance, and a collapsing public health system in many parts of the country. The confluence of these trends has led to severe shortage of medical professionals in many communities, and has worsened the availability of obstetric care, particularly for indigent women and children in underserved urban and rural areas.

With 25% of the US population living in rural areas, access to obstetrical care is a critical public health issue. Rural areas are almost totally dependent on family physicians for care. Family physicians play a central role in the strategy of the National Health Service Corps and the National Association of Community Health Centers for fulfilling primary care needs and for increasing the availability of primary care obstetrical services to underserved populations.[20]

***A prenatal risk reduction program also includes a comprehensive program that addresses cessation of smoking, alcohol and drug abuse . . .***

**Enhanced, Comprehensive and Community-based MCH Services**: The organization of services for young families in many American communities is fragmented and lacks the essential characteristics of comprehensiveness, continuity, coordination, accessibility, and accountability.[21] Effective primary care management is benefited by coordinating multiple problem-oriented social and community services such as home visitation programs, case management conferences with an interdisciplinary team and overseeing the necessary programs, such as financial, child care and transportation. A prenatal risk reduction program also includes a comprehensive program that addresses cessation of smoking, alcohol, and drug abuse as well as occupational and environmental assessment. Coordination of multiple services such as family and social support agencies, criminal justice programs, legal assistance programs, and vocational rehabilitation programs is necessary for those at risk for such conditions as domestic violence, psychiatric illness, stress and anxiety and parenting disorders.

Through education and training, the family physician develops attitudes and skills that qualify him or her to serve a heterogeneous population with divergent needs be they biological, behavioral or social. Family physicians can be leaders in developing an appropriate perinatal care system of the community by merging various perinatal initiatives into a program of care that is easily accessible and responsive to the needs of the underserved.[22,23] A renewed interest in the psychosocial dimensions of care has potential to contribute greatly to an understanding of obstetric outcome. Family physicians can expand prenatal care objectives to include outcomes such as promotion and development of parenting skills, healthy growth and development, immunization and health supervision, positive parent infant interactions, reduction of child abuse and neglect, and identification of behavioral disorders leading to child neglect and family violence.[15]

**Risk Reduction and Health Promotion:** Our MCH system must move away from its current preoccupation with episodic health care and move towards ongoing comprehensive primary care that includes disease prevention and health promotion and integrates responses to psychosocial and medical risks.[24] Counseling to reinforce healthy behaviors and education about pregnancy, childbirth, and parenting are crucial parts of perinatal care. All those who care for childbearing women should approach pregnancy as "an opportunity to promote the health and well-being of the family."[15]

Comprehensive assessment of the risks for poor outcomes carried by a woman and her family allows the physician and the woman to identify her alterable risks to poor pregnancy outcome so that interventions to decrease risk can be planned. Family physicians can play an important role in screening for reproductive risks and once identified, in coordinating evaluation and interventions. For example, information about smoking, alcohol and drug use, prevention of sexually transmitted infection, mobilizing family supports and social services in the community are likely to be beneficial. In family practice, opportunities abound for education about pregnancy, birth, and parenting before the first conception and throughout the parenting years. Pregnancy is an opportunity for more intense involvement.

***Our MCH system must move away from its current preoccupation with episodic health care and move towards ongoing comprehensive primary care that includes disease prevention and health promotion and integrates responses to psychosocial and medical risks.***

**Preconception Care:** Increasing the proportion of primary care physicians who provide specific preconception counseling to patients has been set forth as a national objective for the year 2000.[25] Preconception care is defined as an organized program that identifies and reduces reproductive risks before conception and prepares both parents and the family for pregnancy and childbearing. The goal is to insure that a woman and her partner are healthy and practicing healthy lifestyles before pregnancy. Many of the medical conditions, personal behaviors and psychosocial risks associated with negative outcomes of pregnancy can be identified and modified or treated before conception. Preconception treatment of medical conditions avoids possible negative effects of treatment on the fetus, and many health care options are limited by the time a woman becomes pregnant.[26,27]

Provision of preconception care is a natural extension of the role of the family physician because of the scope and nature of the specialty and family

physicians are already aware of many of the concerns that comprise the preconception visit. Attention to the health of prospective parents before they conceive requires the family physician to extend their health risk assessment and health promotion skills to couples of reproductive age. Examples of such activities include helping patients stop smoking, lose or gain weight, participate in ongoing medical care including early entry to prenatal care, practice effective birth control, and to help families clarify choices about lifestyle, education, and occupations that may affect the decision to become pregnant.

Family physicians can include preconception care as part of standard clinical encounters that are part of family practice such a routine health maintenance, school physicals, premarital examinations, family planning visits, pregnancy test visits (especially when the result is negative), and well child care for another member of the family. Through provision of this care, family physicians can empower a woman to make informed decisions about childbearing.

**Family Centered Care:** The establishment a personal and continuing relationship between a mother and her physician, and the encouragement and facilitation of the normal physiologic processes of pregnancy and childbirth are necessary ingredients to improve pregnancy outcomes. Their responsibility for caring for the physical, psychological and social needs of the woman before, during, and after her pregnancy enables them to acquire an extensive knowledge about many aspects of their patients' lives and an awareness of how they respond to and cope with different forms of stress and challenges.

An established relationship between a woman and her doctor is an important factor in encouraging communication, which in turn will assist the doctor to identify the woman's needs, and to provide appropriate care, advice and support. The physician-patient relationship developed before pregnancy may improve the success of prenatal care by promoting early entry into care and adherence to recommendations. A wealth of information and potential source of continuing support for the family is lost if the caregiver changes when the pregnancy is diagnosed or when the delivery is completed.[3]

**Primary Prevention Saves Money:** Today's sophisticated medical technology can save more low birthweight or premature babies than ever before, but neonatal intensive care is much more costly and risky than preventing LBW by giving women timely and comprehensive prenatal care. Every dollar spent on prenatal care saves more than three dollars in the child's first year of life alone by reducing the need for costly remedial care.[13] The lifetime costs of caring for a low birthweight infant can reach $400,000, and the cost of prenatal care that might prevent the low birthweight condition in the first place can be as little as $400.[16]

Training, motivating and empowering family physicians to provide basic prenatal and normal labor and delivery services will save money. In Canada, Great Britain, New Zealand, and Australia approximately half of the physicians are generalists and these countries depend on family physicians for virtually all theft primary health care. Each of these countries provides universal health care access to their citizens, achieves excellent health care outcomes, and spends dramatically less per capita than does the United States.[28] Studies continue to document the need for more family physicians.[29] The erosion of the primary care infrastructure in the United States is evidenced by the fact that two-thirds of practicing physicians identify themselves as subspecialists and by the declining number of medical students indicating an interest in primary care.[30,31] Substituting generalists for specialists is an essential component to any solution to the substantive problem with spiraling health care costs in the United States.[32]

## Family Physicians in the Delivery Room

Family physicians can provide preventive and supportive care to the majority of families who are healthy and at low risk for complications of pregnancy and birth as indicated by a series of studies that show family physicians provide comparable intrapartum care in low risk populations often with less intervention and greater patient satisfaction.[2,3,33,34] However, as technology has advanced and the level of available intervention has escalated, it has become increasingly difficult for family physicians to acquire and maintain appropriate obstetric skills. For these reasons, family physicians providing obstetrical care need to be aware of their skill level and limitations and must develop consultant relationships with obstetrical colleagues in caring for women with complications. These relationships must involve good communication and appropriate referrals between primary physicians and consultants and between community hospital and tertiary referral centers as is common practice in many areas of medicine.

## Conclusion

Effective maternity care must increasingly include primary prevention programs that improve access to prenatal care, integrate risk assessment activities, and provide intervention programs to modify medical and psychosocial risk.[13-16] Family medicine residency training complements existing educational and clinical resources by emphasizing skills that are needed to provide this expanded care.

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# A Day with a Family Physician

Stephen W. Davis, MD

***The guidelines of the American Academy of Family Physicians suggest that family physicians should be able to manage about 90% to 95% of the problems that present in primary care.***

On the day that I joined Dr W. he had no patients in the hospital, and he began his office hours at his usual 9AM. He and his full-time family physician partner have been together since they finished their residencies in 1982. Recently, they have been joined by a part-time family physician. They have admitting privileges at three hospitals: pediatrics and medicine, which includes intensive and coronary care, at the Memorial Hospital of Rhode Island; medical privileges at The Miriam Hospital; and newborn privileges at Women's and Infants' Hospital. Dr W. usually has two or three patients in the hospital at any time. He and his partners cover their own patients during the week and share weekend call with another pair of family practitioners.

Before seeing patients, he spends a few minutes discussing an employee matter with his partner and checking with the office nurse about patient follow-up. On a typical day, Dr W. leaves home about 7 or 7:30AM and returns home between 7 and 8PM. This day is unusual in that he has neither hospital rounds to make nor a committee meeting to attend. In spite of his full workdays, he relates that he has missed few important school events, parent-teacher conferences, or recitals by his three daughters. The autonomy of private practice has made it possible for him to schedule flexibly when necessary.

The first patient is a 71-year-old woman who has come to the office for left arm pain and numbness in the left hand, probably carpal tunnel syndrome. She also has hypertension. Dr W. cares for her husband, who recently had an abdominal aortic aneurysm repair and gangrene in a toe that required amputation. Dr W. coordinated the care with one of the local vascular surgeons during the hospitalization and continues to manage her husband's anticoagulation medicine. The carpal tunnel problem at this time seems stable. The diagnosis is complicated by her having a history of transient ischemic accidents.

After seeing that patient, Dr W.'s nurse hands him a chart of a patient who called complaining of increasing pain in her leg. She makes an appointment for later in the day.

The next patient is a 72-year-old gentleman who has had 9 weeks of pain from shingles. He complains of persistent nagging pain in spite of having received maximal medical treatment. He reports to Dr W. that he "wouldn't wish this on his worst enemy," and that he has discovered why the Italians call shingles the "Fire of St. Anthony's." Dr W. prescribes some medicine for chronic pain management and discusses the side effects of the medicine. Subsequently, it is noted, the chronic pain medication and/or time helped considerably.

After seeing this patient, Dr W. greets his partner, Dr L., who has arrived at the office and who informs him of two or three problems arising from the previous night on call.

The next patient is a woman with chronic schizophrenia in her early 40s who is in for a complete physical examination. She is quite defensive, slightly paranoid, and exhibits some tangentiality and flight of ideas. She answers questions very defensively. At one point she asks Dr W. if he believes that people have aches and pains because of bones cracking in the grave. He is patient with her, somewhat concrete, but clear in his interpretations and comments. She makes some comments about how some Christian doctors were looking for patients to put in the hospital. He asks about her 16-year-old daughter who recently quit school. Although this patient has been reluctant to be touched in the past, he proceeds with a physical examination, limited because of her reluctance to be touched. Dr W. tries to manage her antipsychotic medicine since she has stopped going to the local community mental health center, but she is not compliant with his dosage adjustments.

Dr W. reports that he deals with psychosocial issues in nearly half of his office visits. The type of contact varies and may include brief discussion or advice about specific problems that the patient may be having. It may include chronic care of schizophrenics or other people with psychiatric diagnoses. He may have a patient return a few times for supportive counseling about a specific problem or difficult event, but he does not do formal counseling or short-term psychotherapy in his practice. If the problem is not resolved at that point, he will make a referral. Many family physicians are trained in their residencies to do formal counseling relating to family dynamics, but Dr W. finds formal counseling to be impractical in the present system of office reimbursement and third-party payers. He admits that he was trained to do more counseling than he has the time to do. However he does deal with depressed patients, anxious patients, the "worried-well," an occasional chronic schizophrenic, parents who need advice about their children, adults who need advice about their parents, and anyone who is subject to the "slings and arrows of outrageous fortune."

Dr W. comments on the way that psychosocial problems present in primary care office practice. Occasionally, the patient's chief complaint deals directly with the problem. It is much

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more common for the chief complaint to be what is referred to as the "ticket of entry," where a medical complaint is offered as the chief complaint, but where the patient's primary concern regards a psychological or social problem. It is not unusual for Dr W. to ask about a patient's hypertension or other medical problem, and the response to be a torrent of tears relating to a different matter.

***Dr W. reports that he deals with psychosocial issues in about 40% to 50% of his office visits.***

The next patient is a 72-year-old woman with primary problems of hypertension and osteoarthritis requiring a cane to walk. She recently has had a laparoscopic cholecystectomy and incisional hernia repair. She talks about how her 39-year old son, who is unemployed, is living with her and her husband and about how the family situation is somewhat rocky. On the other hand, she jokes that her upcoming appointment with the orthopedic surgeon to assess her hip is on April Fools Day. As she leaves, Dr W. gives her some samples of the medicine that she is taking.

The next patient is a 61-year-old businessman with labile high blood pressure, which today is more elevated than usual. He also has gained weight recently and is interested in starting an exercise program. Dr W. counsels him about guidelines for exercising. They talk about the stress of his job, and a medication change is made.

The next patient is a 74-year-old woman with trigeminal neuralgia. She was one of the patients that Dr L. had told Dr W. about from the night call. He discusses the nature of the condition with her, prescribes some medicine, and arranges a follow-up visit. She is accompanied by her husband and daughter. The pain is quite incapacitating. She also had made an appointment for the next day with a dermatologist for this problem. Parenthetically, she kept that appointment and the dermatologist referred her to a neurologist. The neurologist saw her the next day by which time the trigeminal neuralgia was under control. The neurologist agreed with the diagnosis and reported that he would have used the same medication.

The next patient is a 73-year-old woman with hypertension, hypothyroidism, and coronary artery disease. She tells Dr W. how she recently had received a jacket for having walked 10,000 miles in the community fitness program during the last 11 years, but she said that she is slowing down recently because of chest pain while walking. She had a myocardial infarction 5 years before while having a stress test at the hospital. Dr W. makes some changes in her cardiac meds, arranges a diagnostic test, and schedules her back in 2 weeks.

Many family physicians across the country conduct exercise stress testing in their offices or in the hospital. Dr W. does not do this procedure, but he does do flexible sigmoidoscopy as part of his practice. He learned to do this after being in practice for a few years. He learned by doing the procedure with nearby family physicians and with local gastroenterologists when they were performing sigmoidoscopies on Dr W.'s patients. He believes that this is an appropriate service for him to have available for his patients, and he presently does about one or two sigmoidoscopies per week. He has been doing the sigmoidoscopies with biopsies when indicated for 6 years, and he has no major or significant minor complications.

He and his partners also do "lumps and bumps" minor surgery, cryosurgery, and an occasional intra-uterine device insertion. They are considering introducing culposcopy into their practice. The issue of family physicians doing invasive procedures is somewhat controversial. Family doctors do procedures as varied as culposcopy, colonoscopy, appendectomies, Cesarean sections, fracture setting, dilatation and curettage, and obstetrical ultrasound. Often they may be trained during residency, or they may seek additional training after residency. There may be financial incentives for doing procedures (although for Dr W., the time and overhead necessary for his sigmoidoscopies just about offset the reimbursement fee), and often there are geographical reasons for doing them—for example, in rural areas family doctors may be the only doctors in a community capable of doing a certain procedure. Generally, however, family physicians do procedures because it offers a service to the patients, because with adequate training they can be as good at the procedure as anyone, and because they like the experience of doing them.

The next patient is an 82-year-old male with hypertension, benign prostatic hypertrophy, and a history of renal cell carcinoma. He also has a monoclonal gammopathy that Dr W. is following in conjunction with a hematologist. He has come in for assessment of his blood pressure and adjustment of his hypertension medicines. He has recently been seen by the urologist for prostate problems. His renal cell carcinoma was discovered about 7 years ago when he came to the office with painless hematuria. Dr W. referred him to the same urologist who did an apparently curative nephrectomy.

This case is fairly typical of the way that Dr W. shares the care of his patients with specialists. Patients present with a problem, symptom, or group of symptoms, and it is the family physician's role to define the problem and to decide if this is a problem that he or she can diagnose, diagnose and manage, or that needs to be referred. For many non-specific problems this process may be the most difficult step in the chain; for example, are these vague aches and pains related to social stress, overuse, a connective tissue disorder, an underlying malignancy, or an acute or chronic disease?

***. . . the close relationship that many family physicians have with their patients and the long-term continuity of care that they provide is a buffer against malpractice cases.***

The guidelines of the American Academy of Family Physicians suggest that family physicians should be able to manage about 90% to 95% of the problems that present in primary care. Dr W. estimates that this is true of his practice. He needs to refer for diagnostic or treatment purposes about 5% to 10% of the patients that he sees. He may refer a patient for a necessary procedure such as endoscopy; he may

refer for a form of treatment that he cannot give such as chemotherapy or a surgical procedure; or he may refer to a specialist for confirmation of a diagnosis or for a second opinion. Usually after referral, depending on the problem, he may follow the patient alone or may do so in conjunction with the specialist. Nevertheless, he manages most of the presenting problems alone.

The role of the family physician in inpatient care is a complex one, and it is there that family physicians have one of their most important duties. As hospital diagnosis and treatment become more complicated and as specialty care becomes more common and more detailed, it becomes more necessary for the patient and the patient's family to have a coordinator of care. They need someone who can help to make the difficult decisions with them, someone who can help them to understand the events that are taking place during the hospitalization, and someone who will listen to their unique responses to this hospitalization and what it means to them. The patient also needs someone who will be his or her advocate in the complicated process of being in the hospital, and who will work with the necessary consultants to orchestrate the activities. While many primary care physicians assume these responsibilities and carry them out well, family medicine recognizes and emphasizes these activities as important and necessary in the care of hospitalized patients.

The next patient is a 62-year-old who is an alcoholic with severe anxiety. He has a long litany of symptoms today. Dr W. listens sympathetically for a longer period of time than he has scheduled, and then keeps the diagnostic tests to a minimum. He has known this patient for more than a decade, sees him in the office on a regular basis, and has learned his pattern of problems and complaints.

I did not see all of Dr W. 's patients with him on the day of my visit. During his afternoon session, he saw patients of varied ages with varied medical problems. Among those were the following:

- An 84-year-old woman with a history of osteoarthritis and spinal compression fractures. She had spent time recovering from those problems in a nursing home but now is living alone. She is doing well, and both she and Dr W. are pleased with her progress.
- A 67-year-old woman here for a return visit of a recent bronchitis. Her coughing had been so severe that she had fractured a rib. She also has a psychiatric history that Dr W. has been managing with a psychiatrist, whom she has been seeing for years.
- A woman in her late 60s for a routine visit. She had had several years of atypical abdominal pain that had been evaluated with ultrasounds and C-T scans with no obvious diagnosis obvious. After about 3 years, a laparotomy was done, and an adenocarcinoma of the fallopian tubes was discovered that had not been seen on any of the diagnostic imaging tests. The surgery was apparently curative. Now she is followed in conjunction with a pulmonary specialist for her chronic obstructive pulmonary disease.

***The issue of family physicians doing invasive procedures is somewhat controversial. Family doctors do procedures as varied as culposcopy, colonoscopy, appendectomies, Cesarean sections, fracture-setting, dilation and currettage and obstetrical ultrasound.***

- A 44-year-old man with alcoholic cirrhosis, which recently required an extensive hospital stay for treatment of cirrhosis and ascites. He had been doing well since discharge and has taken more control of his life. He had been denied payment by one insurance company claiming that because he had some ankle swelling several years ago the cirrhosis is a preexisting condition. Dr W. dictated a letter for the patient in response to that claim. Family physicians, as do other doctors, are often in the position of being the advocate for the patient in one way or another.
- A 96-year-old male who was here for a follow-up 2 days after presenting with increased peripheral edema. He has responded well to the increased diuretics that Dr W. had given him and to the tender loving care that the visiting nurses had supplied. The gentleman lives alone; however, his youngest brother who watches out for him is with him today. His 78-year-old brother has mild congestive heart failure, hypertension, and emphysema.
- A 46-year-old female who has recently been treated with chemotherapy and radiation to her lung and brain for lung cancer. She has some complaints of peripheral neuropathy that is felt to be due to her chemotherapy treatments. She obviously is taking pains to maintain her attractive appearance in spite of her chemotherapy.

Dr W. did not see any pediatric patients in his office this day until after school hours. On this day he saw fewer children than usual. Normally, about 20% of his practice consists of pediatrics. Today he saw a 3 -year-old boy who had an otitis media 3 weeks before, and who was starting to have upper respiratory complaints again with a little bit of ear pain. This problem was assessed and treated. Dr W. noticed that the boy is short but apparently there is a family pattern for short height. A dental referral also is made at the mother's request.

This afternoon Dr W. saw a 34-year-old woman who had had a temporarily rapid heart beat earlier in the day, and he saw an 18 month old with 1 days of a barking cough consistent with viral croup.

The next patient was a 12-day-old who is here for a routine newborn follow-up. The baby is doing well. The mother is breast-feeding and most of the conversation deals with the mother's plan for contraception and with other advice concerning the breast-feeding. As mentioned above, Dr W. has privileges to care for newborns at the Memorial Hospital and at Women's and Infants' Hospital. He has decided against doing obstetrics as part of his practice. This decision was made based primarily on lifestyle considerations. It is not unusual, however, for family physicians to include obstetrics. There is great geographical variation in the number who do. Across the United States about

28% of family physicians do obstetrics. The West, Midwest, and rural areas have the highest percentages of obstetrical care provided by family physicians. Dr W. regrets not doing obstetrics because of the additional continuity of care that it would provide as well as for other reasons.

I realized that I had seen in 1 day two patients who were probably the youngest (12 days) and the oldest (96 years) in Dr W.'s practice. Family medicine attempts to do more than to take care of all ages. Family medicine is more than a mixture of primary care medicine, primary care pediatrics, and primary care obstetrics and gynecology. Family medicine emphasizes that personal relationships, social interactions, and family dynamics are important factors in a person's health. Family medicine stresses continuity of care since it is important for the patient to know the physician as well as for the physician to know the patient and the patient's unique characteristics.

Because family physicians deal *de novo* with so many different types of problems, they run a risk of medical malpractice. Studies have shown, however, and Dr W.'s experience seems to support it, that the close relationship that many family physicians have with their patients and the long-term continuity of care that they provide is a buffer against malpractice cases. Family physicians do, of course, get sued for malpractice, but at lower rates.

Dr W. enjoys his practice, and he enjoys his patients. He is pleased that his oldest daughter is thinking about becoming a family physician. He thinks that he probably would become a physician if he had the decision to make again. He finds that the rewards and enjoyments are about constant, but that the negative parts of medicine—the paperwork, the third-party payer complications, the medico-legal considerations—are increasing; nevertheless, he cannot think of another profession that would give him the same personal rewards. He is also somewhat discouraged by the financial imbalances in the medical profession, and he has hopes that the Resource-based Relative Value Scale efforts will correct some of the inequities.

The varieties of patients, ages, presenting problems, and diagnoses are the challenge as well as the pleasure of family medicine. As Dr W.'s practice demonstrates, the family doctor is at the front line of the health care system, but, more than that, the family doctor also helps patients to navigate the health care system by making appropriate referrals for specialty care, by guiding patients through hospitalizations and diagnostic evaluations, by providing care through the life span, and by knowing individual patients, their nuances, their risks, and their unique responses to stress and disease.

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Yohimbine exerts a stimulating action on the mood and may increase anxiety. Such actions have not been adequately studied or related to dosage although they appear to require high doses of the drug. Yohimbine has a mild anti-diuretic action, probably via stimulation of hypothalmic centers and release of posterior pituitary hormone.

Reportedly, Yohimbine exerts no significant influence on cardiac stimulation and other effects mediated by B-adrenergic receptors. Its effect on blood pressure, if any, would be to lower it; however no adequate studies are at hand to quantitate this effect in terms of Yohimbine dosage.

**Indications:** Yocon® is indicated as a sympathicolytic and mydriatric. It may have activity as an aphrodisiac.

**Contraindications:** Renal diseases, and patient's sensitive to the drug. In view of the limited and inadequate information at hand, no precise tabulation can be offered of additional contraindications.

**Warning:** Generally, this drug is not proposed for use in females and certainly must not be used during pregnancy. Neither is this drug proposed for use in pediatric, geriatric or cardio-renal patients with gastric or duodenal ulcer history. Nor should it be used in conjunction with mood-modifying drugs such as antidepressants, or in psychiatric patients in general.

**Adverse Reactions:** Yohimbine readily penetrates the (CNS) and produces a complex pattern of responses in lower doses than required to produce peripheral a-adrenergic blockade. These include, anti-diuresis, a general picture of central excitation including elevation of blood pressure and heart rate, increased motor activity, irritability and tremor. Sweating, nausea and vomiting are common after parenteral administration of the drug.[1,2] Also dizziness, headache, skin flushing reported when used orally.[1,3]

**Dosage and Administration:** Experimental dosage reported in treatment of erectile impotence.[1,3,4] 1 tablet (5.4 mg) 3 times a day, to adult males taken orally. Occasional side effects reported with this dosage are nausea, dizziness or nervousness. In the event of side effects dosage to be reduced to ½ tablet 3 times a day, followed by gradual increases to 1 tablet 3 times a day. Reported therapy not more than 10 weeks.[3]

**How Supplied:** Oral tablets of Yocon® 1/12 gr. 5.4 mg in bottles of 100's NDC 53159-001-01 and 1000's NDC 53159-001-10.

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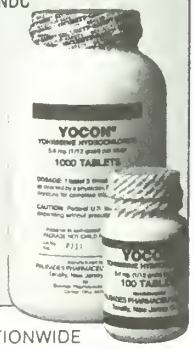


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# Pharmacotherapy in Family Medicine: Current Issues and Strategies

Anne L. Hume, PharmD, BCPS

***. . . inadequate communication may be an important factor to: (1) noncompliance with prescribed regimens; (2) treatment "failures"; and (3) adverse reactions.***

Almost a decade ago, an article in a British medical journal stated that it was far more difficult to be *a competent generalist,* than an expert specialist. In the 1990s, primary care practitioners probably would agree with this statement. While family physicians must be familiar with thrombolytic agents and new antiretroviral drugs, even the selection of the most appropriate antihypertensive agent remains a challenge. This article will focus on pharmacotherapy issues challenging all primary care providers, and family physicians in particular, and will offer potential strategies for their resolution.

## Medication Choices

> And so unto the beta-blockers, it was said: go forth, be fruitful and multiply,
> So propran- doth begat aten- and nad- and metopr-
> And acebut-, labet-, pind-, betax-, penbut-, tim-, carte- came forth,
> with many more -olols soon to follow . . .

Similar verses could be written for many drug classes as the family physician is confronted with a "therapeutic jungle" from which to choose medications for patients who frequently cannot afford the newest drugs. Claims from pharmaceutical representatives and advertisements for new drugs promoting the presence or absence of a certain chemical group or a unique pharmacokinetic property and its purported advantages now inundate physicians. In the case of ACE inhibitors, ads extol the absence of a sulfhydryl group or the presence of a phosphoryl group, implying significant clinical benefits. However, it still must be recognized that the majority of the drugs approved by the Food and Drug Administration, and specifically used in primary care, do not represent an important therapeutic advance.

While the problem of "me-too" drugs can be controlled by prescribing only one or two agents within a given class such as the beta-blockers, this approach has its limitations. As an example, although calcium channel blockers have been described as one class, they probably represent at least four different pharmacologic groups including the nifedipine (or dihydropyridine) group, diltiazem, verapamil, and bepredil. While the first three are effective antihypertensive agents, their potential benefits and side effects may differ substantially in individual patients.

Compounding the problem of deciding whether a drug is a "me-too" or not, the selection of drugs such as antihypertensive agents is no longer simply a matter of lowering blood pressure. Increasingly drugs are chosen on the basis of matching ancillary pharmacologic properties to individual patients. In the case of calcium channel blockers, diltiazem may be of some benefit in the setting of a non-Q wave myocardial infarction, while others may have detrimental effects. Diltiazem and verapamil may reduce the proteinuria of diabetic nephropathy, while nifedipine may worsen it. Some agents may slow the progression of atherosclerosis. As a result, the question "what is the best calcium channel blocker for the individual with hypertension?" becomes progressively more difficult to answer.

Another challenge for family physicians who have been in practice for any length of time is that the use of many common medications goes through cycles of controversy. The use of estrogen replacement therapy (ERT) in postmenopausal women is one example.[1] A woman between the ages of 65 and 74 years has a 6% risk of death from ischemic heart disease, a 0.6% risk of death from hip fracture complications, and a 0.4% risk of death from endometrial cancer. If ERT decreases the risk of ischemic heart disease death and risk of hip fracture by 40% and 60% respectively, the benefits clearly outweigh even a postulated 4 to 6-fold increase in endometrial cancer. Synthesizing this data from varied epidemiologic studies, in the absence of actual data from a clinical trial, is very difficult for the practicing physician. It is important to note that the Women's Health Initiative will be the first clinical study to address specifically all of the potential risks and benefits with ERT.

While it is critical that our knowledge of the risks and benefits of any intervention continues to grow, conflicting evidence from epidemiologic and clinical studies makes it increasingly more difficult for the family physician to interpret and apply clinical studies in actual practice. The publication and subsequent promotion of small controversial studies that later are identified as possessing serious methodological flaws does little to advance the clinical use of drugs in the primary care setting. This is especially true when patients may know about the same study from the lay press or from

***ABBREVIATIONS USED:***
***ACE: Angiotennsin converting enzyme (inhibitors)***
***DTCA: Direct-to-consumer advertising***
***ERT: Estrogen replacement therapy***
***MEMS: Medication Event Monitoring System***

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television and demand "black and white" answers as to the risks and benefits associated with a given intervention.

Finally many important clinical trials must exclude the type of complicated patients seen in primary care and as a result do not address important questions about the use of drugs in these patients. One study comparing propranolol, methyldopa, and captopril on quality of life measures included only white, fully employed, mostly married men between the ages of 21 and 65 with a median annual income over $30,000. Family physicians are challenged to find the actual relevance of these findings to the care of the elderly widow with isolated systolic hypertension living alone on a fixed income. Thus for the family physician, pharmacotherapy issues may range from the basic problems in selecting between "me-too" drugs to the application of national practice guidelines and clinical studies into the every day care of patients.

## Counseling and Compliance

The Healthy People 2000[2] report includes, as a national objective, a goal to increase to at least 75% the number of primary care providers who routinely review new drug regimens with their patients who are 65 years and older. Family physicians have always been committed to patient education about drugs. In recent years, increasing demands on the time of both physicians and pharmacists and the lack of reimbursement for counseling services have raised barriers to this critical aspect of patient care. In addition, the time for counseling traditionally is at the end of an office visit, when, according to several studies, patients may not remember the details of what has been discussed.[3]

Talking with patients about their drugs is "low-tech" and easily overlooked as a therapeutic intervention. However, inadequate communication may be an important contributing factor to: (1) noncompliance with prescribed regimens; (2) treatment "failures"; and (3) adverse reactions. Noncompliance, or more specifically partial compliance,[4] remains a problem in the management of many common chronic diseases in the primary care setting. While our understanding of the importance of patients' beliefs and values, the patient-physician relationship, and the complexities of the disease process on compliance has increased, it continues to present many challenges. As the former Surgeon General, Dr C. Everett Koop, once said, "Drugs don't work when people don't take them."

These points are important especially as direct-to-consumer-advertising (DTCA) of prescription drugs is increasing and may further undermine professional medication counseling. When the family physician is promoting lifestyle changes such as weight loss, he or she in the future may have to compete with slickly packaged ads that promote a drug to solve the same problem. Imagine a 60-second television commercial featuring Angela Lansbury answering questions about flecainide from "real people" on the street? "Angela, I've heard flecainide is really strong, but is it safe?" Fifteen seconds of nonsense about buffering will not suffice.

## Strategies for Pharmacotherapy Problems

In addressing pharmacotherapy problems at the residency level, faculty as well as national organizations such as the Society of Teachers of Family Medicine have recognized that residents need basic and advanced knowledge of drug therapy. More important, residents must develop the necessary skills to evaluate new drugs and controversial clinical studies critically. This evaluation always should be in the context of actual patient need, cost of treatment, safety, and efficacy.

Commercially sponsored programs on the residency level must be evaluated rigorously for their scientific accuracy and integrity. Recognition that while pharmaceutical representatives may provide information about new medications, they are salespeople, sometimes with a very limited knowledge beyond their scripted presentation, and as such are not appropriate resources for the education of residents about pharmacotherapy. This remains a key responsibility of the faculty of any given residency program.

For the practicing physician, balanced resources of pharmacologic information include the *Medical Letter,* which is an easy, inexpensive method for "keeping up" with new medications. Although this publication has been criticized for being "too pessimistic," one only has to review issues from several years ago and compare its initial evaluation to subsequent experiences with the drug to recognize that the *Medical Letter* is usually correct. Also, in Rhode Island, the Drug Information Center supported by the University of Rhode Island College of Pharmacy is an unbiased resource to answer pharmacotherapy questions from physicians and other health care providers.

***. . . for the family physician, pharmacotherapy issues may range from the basic problems in selecting between "me-too" drugs, to the application of national practice guidelines and clinical studies into the everyday care of patients.***

For good patient counseling, recognition that no one strategy will be effective for every patient or practice setting is essential. Patient counseling must be conducted in an atmosphere sensitive to an individual patient's cultural or ethnic background, age, and concomitant illnesses. In Rhode Island, a state rich in terms of its ethnic diversity, the concept of chronic medication use may be new to certain cultures. If the physician has not discussed the importance and chronic nature of a disease such as hypertension as well as the need for a specific drug, an individual patient may assume that his or her high blood pressure treatment is completed and their disease cured, when the "last" refill is received.

Counseling the older patient may require specific attention to poor vision, diminished hearing, and possible cognitive impairment. The value of performing a "brown bag" evaluation where the patient is asked to bring all routine, PRN, and "saved" prescrip-

tion and over-the-counter drugs is inexpensive and worthwhile, not only in terms of problem-solving drug-induced disease, but also in preventing future medication-related problems.

In addition to medication aids such as videotapes and computer-assisted teaching programs, the direct participation of family members and friends in counseling may be helpful for some older individuals. The involvement of the patient's family pharmacist also may improve both counseling and compliance and may range from simply requests that the print size on the label be larger than usual to direct consults about refill patterns, nonprescription drug use, or possible drug interactions.

Previously, the available methods for monitoring compliance were limited to patient self-report, pill counts and drug assays. With the recent availability of microelectronic monitoring, this tool may represent an important advance in primary care for diagnosing adherence problems and for identifying possible strategies for their resolution with individual patients. One example of electronic monitoring is the Medication Event Monitoring System (MEMS), which contains a microprocessor in a prescription bottle cap that records the date and time the bottle is opened. The data in the cap can be retrieved using a communicator and computer that generate a monthly record of when the bottle was opened (and the medication presumably taken). The clinician can then review the print-out with the patient. This system could be especially valuable when used in conjunction with serum concentrations of drugs such as phenytoin.

McKenney et al[5] recently reported the value of using MEMS in ambulatory patients with hypertension. Individuals using MEMS had an average compliance rate of 95.1% with average reductions in their systolic and diastolic blood pressures of 7.6 mm HG and 8.8 mm HG, respectively, over a 6-month period. Control subjects over the same time period averaged a compliance rate of 78% and decreases of 2.8 mm HG and 0.2 mm HG in systolic and diastolic blood pressures, respectively. When the MEMS product was combined with older compliance aids such as a pocket-sized card for recording blood pressure and a blood pressure cuff for self-monitoring, compliance rates increased to 100% and resulted in further reductions in blood pressure.

For patients with documented problems remembering to take the prescribed dose, the use of an aid such the MediTrack Medication System® might be of possible benefit. This product is a new compliance and tracking system that automatically records the time and day of the week that the container was last opened. The digital timepiece can be set to "beep" whenever it is time to take a dose and the display will flash to signal an overdue dose. The digital display also shows the time the system was last opened and may help older individuals avoid the risks of either overmedicating or undermedicating. These newer technologies, when combined with better and more consistent counseling about medications, may serve to improve long-term compliance in the primary care setting.

## Summary

Pharmacotherapy is an increasingly complicated area for the primary care physician. However, many resources, techniques, and technologies are now available that may minimize complications, improve compliance, and maximize the benefits patients derive from the use of their medications.

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# The Teaching Community Health Center

Brian Jack, MD
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***Rhode Island Community Health Centers are a source of primary care for the estimated 56,000 people in the state lacking access to health services.***

A great and unmet health care need faces poor and underinsured Americans. Over the past 25 years, the Community Health Center (CHC) program has been developed to provide community-oriented health care to help meet this need. However, CHCs often have problems recruiting staff because of unfamiliarity with complex medical and psychosocial conditions fouond in CHCs and the unique financial, administrative, and professional structure found in these settings. Concomitantly, residency training programs for primary care physicians are increasingly criticized for their lack of involvement in the community and for their "ivory tower" approach to medical care.[1,2] The Department of Family Medicine at Brown University/Memorial Hospital of Rhode Island has developed an innovative linkage with Rhode Island CHCs to address these two common problems. This article discusses the development of a Teaching CHC program in Rhode Island. We believe that linkages between an academic department of family practice and a CHC network provide a model to train future leaders in community-based care, promote needed access to primary care, and build an infrastructure for CHC-based medical education and research.

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## The Community Health Center

CHCs are non-profit, private corporations that provide comprehensive primary care and prevention services to underserved populations in over 1500 sites around the United States. In 1990, Community and Migrant Health Centers served more than 6.2 million unduplicated clients. Approximately 60% of the patients are from minority groups and about 40% are children. One half of the patients have no health insurance, 40% have Medicare or Medicaid, and 10 are private health insurance. A typical health center serves about 11,500 patients a year and has between five and six full-time physicians, one dentist, three mid-level providers and approximately 13 other health professionals such as nutritionists, social workers, and patient educators. CHCs typically have an executive director hired by the board of directors and a medical director who supervises the clinical staff and service areas. Emphasis is placed on providing comprehensive health services in an outpatient setting. CHCs are characterized by involvement of consumers in governing the center, ensuring that each community's particular needs are addressed. Other characteristic features are the center's role in the economic development of the community, and a multidisciplinary model of health care delivery. By regulation, federally supported health centers do not turn clients away because of inability to pay for services.[3]

Rhode Island has 14 community health centers who share the mission of the national CHC movement. Rhode Island CHCs are a source of primary care for the estimated 56,000 people in the state lacking access to health services. Of the patients seen in Rhode Island CHCs, more than 50% are below the poverty level, 50% are uninsured and 33% have Medicaid. Some health centers in Rhode Island are free-standing while others operate under a larger social service agency; some work on a specialty model and others on a family practice model. Each provides valuable service to the people of Rhode Island.

## Brief History of CHCs

CHC development was closely linked with the "War on Poverty" campaign that was launched in the 1960s. Ironically, health care was not initially identified as a priority for funding by the Office of Economic Opportunity (OEO), which was the agency coordinating the War on Poverty. In a short time it became apparent that a major obstacle to job training and educational programs was poor health and a lack of access to medical care. The usual sources of health care for the uninsured were emergency rooms, public

***ABBREVIATIONS USED:***
***BHCDA: Bureau of Health Care Delivery and Assistance***
***BVCAP: Blackstone Valley Community Action Program***
***BVCHC: Blackstone Valley Community Health Care***
***BVPN: Blackstone Valley Perinatal Network***
***CHC: Community Health Center***
***FQHC: Federally Qualified Health Center***
***HRSA: Health Resources and Services Administration***
***MATCH: Manpower Access to Community Health***
***MCH: Maternal and Child Health***
***NACHC: National Association of Community Health Centers***
***NHSC: National Health Service Corps***
***OBRA: Omnibus Reconciliation Act***
***OEO: Office of Economic Opportunity***
***SPRANS: Special Projects of Regional and National Significance***

health departments, and medical school outpatient clinics. Most of these were inadequate since care was episodic and lacked continuity or preventive measures. A new model of health care for poor communities was born in 1965 through the work of two physicians from Tufts University and officials at OEO. The first community health center in Mound Bayou, Mississippi was funded in June 1965. Additional centers were quickly established in New York, Los Angeles, Chicago and Denver.

In 1966 Senator Edward Kennedy offered an amendment to the Economic Opportunity Act to establish a Comprehensive Health Center Program. By 1971, 150 health centers had been established, two-thirds funded by OEO and a third by the Department of Health Education and Welfare. Since 1975 funding for health centers has been under Title III, Section 330 of the Public Health Service Act. In recent years, an increasing number of CHCs were designated as Federally Qualified Health Centers (FQHC), a designation that allows reimbursement from Medicaid on a cost basis in accordance with the Omnibus Budget Reconciliation Act (OBRA) of 1989. OBRA 89 and 90 also expanded eligibility for Medicaid. The resultant increased financial stability has important ramifications for Rhode Island CHCs since it will allow CHCs to expand services based on local need.

## Linking an Academic Department and a CHC

CHCs will play an increasing role in providing the primary health care infrastructure needed to deliver medical care to medically underserved, disadvantaged populations. The federal Health Resources and Services Administration (HRSA) and National Association of Community Health Centers (NACHC) have developed a vision that calls for the expansion of community health centers to serve all medically underserved populations in the US by the year 2000 as part of the national health care reform movement.

A sufficient supply of high quality primary care physicians and other health professionals is critical for this planned expanded access system. As in many parts of our state and country, there is need locally for increasing numbers of primary care physicians both willing and trained to provide primary care in underserved communities.[4] The Blackstone Valley area, although over-doctored at the specialist and subspecialist level, has a severe shortage of primary care physicians. A needs study conducted last year identified a shortage of more than 20 primary care physicians in the lower Blackstone Valley (Central Falls and Pawtucket). This health manpower shortage has been worsened by the curtailment of the National Health Service Corps (NHSC). Linking a medical school academic department and a CHC may be one approach to recruiting trainees into primary care and CHC careers.

Family physicians play a central role in the strategy of NACHC and NHSC in fulfilling primary care manpower needs.[5] The Department of Family Medicine at Brown University/ Memorial Hospital of Rhode Island is a natural ally with local CHCs, since both advocate many of the same principles: a commitment to the broader issues of health care, such as equal access for all, an interest in prevention strategies including risk assessment and heath promotion, and an interdisciplinary approach to health care delivery.[6] The Brown Department of Family Medicine has been instrumental in supporting the national movement to increase the amount of ambulatory and community-based training experiences for medical students and residents, and for academic centers to become involved in community health needs. The department places a high priority on socially responsive medical education and is preparing physicians who will provide improved access to enhanced, community-based primary care. For these reasons, CHCs were seen as an ideal place for linking training and education while providing mutually beneficial academic/service model for community-oriented medical education.

***Teaching hospitals provide excellent opportunities for developing many skills, but the skills necessary for community-based programs must be obtained in sites such as CHCs.***

The departmental goals in developing the teaching CHC concept are: (1) to develop high quality medical leadership devoted to responding to the health needs of the American underserved; (2) to improve the ability of health centers to develop and manage programs, work with communities, and effectively use federal and state resources; and (3) to improve the ability of medical schools and CHCs to work together to respond innovatively to the health needs of their communities, to properly evaluate new and existing programs, and to establish the curriculum and resources needed for CHC-based teaching programs. The department seeks to accomplish this through the skills it imparts to residents and MCH fellows and through building model programs in these areas.

## Developing the Teaching CHC

During the 1970s, this sense of purpose led department leadership to help establish two health centers in Pawtucket and Central Falls. By the mid-70s, these centers became independent organizations under the direction of community boards. Department faculty have played important roles on the boards of directors since the 1970s. Graduates of the department have served as local CHC physicians for the past two decades, primarily through the NHSC.

In the mid-1980s, as the NHSC was phased down, it became clear that innovative ways to recruit, staff, and retain physicians in CHCs was necessary. In September 1987 the Department of Family Medicine, the Rhode Island Department of Health, and Rhode Island Community Health Center Association received a special projects award from HRSA to support initial planning and development of the teaching CHC concept at the Pawtucket and Central Falls health centers. Following successful completion of this initial planning process, the department received additional funding through our Family Medicine Residency Section 786 Grant to develop these training sites.

In 1987, the department perceived

that developing a residency curriculum to teach the CHC concept as its primary mission related to the health centers. Instead, the last 4 years have been spent assuring the basic survival of clinical services at the two health centers. From 1989 to 1991, the department worked with a state-local task force created by the mayors' offices of Pawtucket and Central Falls to combine the two CHCs into a single agency. Delicate political negotiations merged partial membership from two culturally different boards of directors. Moreover, new agency wrote a replacement federal 330 health center program grant. This transition resulted from the Bureau of Health Care Delivery and Assistance (BHCDA)'s review of the operation of the federal 330-funded health center in Central Falls. On the basis of this review, in spring 1989, BHCDA mandated the community to replace the local Community Action Program, which had operated the center since its inception, with an independent community board. This board was to form a new corporate entity with authority to operate both health centers. These changes took place during a time of great staff turmoil, which followed the discontinuation of the NHSC. Department faculty volunteered the equivalent of a full-time physician in patient care time at the centers to enable the centers to remain in existence while the search for their full- time family physicians was in progress.

These changes provided the opportunity to structure a fundamentally sound, properly administered health center system for the Blackstone Valley community. It has resulted in solid commitment from all involved with the centers, including community leaders, the board of directors, professional staff, support staff, and patients. The new Blackstone Valley Community Health Care, Inc. (BVCHC), which emerged from this process in December 1989, has been able to attract a new, energetic and experienced executive and financial leadership. Subsequently, an inter-agency agreement was successfully negotiated with the newly formed BVCHC to establish the CHC-based residency program. These negotiations established clinical faculty positions at the two health centers, each of which include four to five sessions per week devoted to teaching and participation in residency training activities with our hospital-based family practice residency. The department and the health centers jointly recruited full-time board-certified family physicians for each health center site who have become integral contributors to the health centers and to the residency training program. Because of this successful linkage, the department has moved to establish links with other RI health centers, including the Cranston Health Center. Because of this relationship, Cranston Health Center has been able to recruit two family physicians in the last year. These physicians now provide needed health services to the Cranston and Coventry communities and the clinical faculty provide precepting and inpatient attending services for the residency program.

## CHC-based Fellowship Training

The need for improved access to obstetric and pediatric outpatient services in CHCs throughout Rhode Island led to the inauguration of a jointly run maternal and child health (MCH) fellowship in July 1991. This is the first program in the United States that links a medical school academic department and a federally-funded CHC network at the fellowship level. The goals of the fellowship program mirror the goals of the residency component, ie, to train future leaders to provide MCH services to medically underserved populations, provide needed access to prenatal care for young families, and provide clinical, academic, and health policy skills for family practice physicians interested in careers developing community-based programs.

Fellows fill both an inpatient and outpatient role, caring for over 900 mother and infant pairs each year, including prenatal, labor and delivery, postpartum, nursery and pediatric care. The training goes beyond clinical experience. As employees of BVCHC, the fellows gain experience organizing and running the health centers and in working with public policy issues. The fellows learn how to advocate on behalf of health centers and to obtain funding from city, state and federal programs. To further reach these goals, the Brown University School of Medicine's Department of Community Health provides course work leading to a Masters of Science degree in Community Health. Academic work includes course work in statistics, epidemiology, research techniques, and an MCH-related thesis. The thesis is prepared under the joint guidance of faculty from the Departments of Family Medicine and Community Health.

The increasing demand for obstetrical services in the public sector, and the success of the personalized, community-based care, led to expansion of the program to other CHCs in Rhode Island including Cranston and East Providence. This expansion has been aided by linkage with the NACHC Manpower Access to Community Health (MATCH) Fellowship Program, an established leadership development program that aims to increase CHC leadership capabilities. During the first year of the fellowship, fellows pursue MCI/MATCH fellowship activities, clinical activities, and begin their graduate school training. In the research-oriented second year, in addition to their clinical activity, they initiate a series of community-based MCH research projects.

## Some Advantages of the Teaching CHC

The linkages described have served to create attractive long-term career options for physicians at local CHCs. There are several reasons why recruitment and retention of physicians by CHCs are often difficult. CHC physicians are typically at the beginning of their careers. They do not have special training in the skills needed to develop and run successful programs and may feel uncomfortable or overwhelmed with the following characteristics of a CHC practice:

- neglected medical and psychosocial conditions found in CHC populations;
- professional isolation;
- complex financial structures (330 funds, state grant sources);
- administrative groups (executive director, non-profit board of directors);
- the necessary team approach to providing services, including commu-

nication between case managers, nutritionists, substance abuse professionals, social workers, and physicians; and
- a myriad of necessary social and community resources such as mental health, substance abuse treatment, vocational and social service agencies, the legal system, teenage pregnancy projects, child protective services and human service agencies.

These obstacles may be overcome by providing CHC-based training to residents and fellows and by addressing these issues in an organized core curriculum. The core curriculum, including a continuity practice experience at the health center sites, provides a strong basis for the post-graduate preparation of family physicians with special skills in working in underserved settings and responding to the needs of urban populations.[7]

CHCs provide trainees with meaningful exposure to the cultural, social, economic and clinical needs of underserved communities. To develop a greater understanding of the cultural determinants of behaviors related to sexuality, pregnancy, health care use, and well-child care of underserved and minority populations, a clinical role for an anthropologist has been structured. This has led to an understanding of the cultural dynamics surrounding health care utilization, the presentation of illness to health care personnel, and the role of the health center in the community.[8]

Teaching hospitals provide excellent opportunities for developing many skills, but the skills necessary for community-based programs must be obtained in sites such as CHCs. The formal relationship developed between the residency program and the CHCs in our community has enhanced the professional environment for teachers, learners, and patients. Often, the necessity to provide services efficiently impedes development of time consuming educational experiences for physician trainees in CHCs. By developing a teaching community health center, an educational infrastructure is built where teaching and learning occurs among students, residents, and attending physicians. In this way a teaching environment is build that promotes camaraderie, and where the challenges and joys of caring for the underserved are promoted and fostered. Currently, busy CHC physicians, working in isolation, are unable to promote this kind of atmosphere. Exposure of medical students to community-based primary care experiences increases the likelihood that the medical students will choose a career in primary care.

Besides serving as a training site for students, residents and fellows, CHCs also provide strong role models for minority and disadvantaged students to enter and remain in a health professional career. Health center staff generally come from the communities in which they are located. As primary care-providers, the staff also will know the community's families and children better than most, and are in a strong position to identify and recruit students that are most likely to succeed in a health professional career. There are data to show that students from underserved populations are much more likely to return to serve these populations.

Linking departmental activities with local CHCs also provides a community setting for carrying out primary care research - a major goal of the department. Research activities in CHCs benefit both parties. CHCs can use departmental research expertise and facilities while gaining important information useful in planning and evaluating programmatic activities. The family medicine department can use CHC data in such areas as clinical investigations, medical effectiveness research, quality assurance research, and other health services research.

## Conclusion

We have been gratified with the enthusiastic response of our residents to the concept of CHCs and residency education over the past several years. Since 1990, we have seen a steady increase in the number of our graduates who assume health center positions. Over the past 3 years, 21 of 36 graduates have assumed such positions, indicating that the sense of mission we wish to impart is in tune with the career aspirations of a significant number of medical students choosing our residency program.

The changes described in this article have facilitated the development of a unified approach to health care in our community. We now have in place a strong community health center clinical program and a strong basis of trust and administrative understanding upon which to build a community-based primary care residency training program. We share a common clinical approach and goals for education of medical students, residents and fellows, one system for inpatient care, and a standard community approach to obstetrical care. This project provides a model for developing community-oriented medical education in CHCs. At a time when access to primary care is in crisis, and when there simply are not enough providers willing to care for underprivileged Americans, training in both comprehensive clinical skills and the particular skills needed to address the distinct needs of CHC patients will make a valuable contribution to medical care in Rhode Island.

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# Family Medicine Research: Need for Capacity-building

Larry Culpepper, MD, MPH

***Family medicine is the only medical specialty that has emerged because of social need and a political mandate.***

This year we will spend more than $9 billion on medical research through the National Institutes of Health budget. Yet:

1. We do not know the value of antibiotic therapy for the most common pediatric problem seen by pediatricians and family physicians, otitis media.
2. We do not know the effectiveness of therapies for the most common and most expensive cause of workers disability in the United States and worldwide, low back pain.
3. We have considerable knowledge regarding the 1% to 3% of medical activities that occur in tertiary hospitals and account for a major portion of the escalating medical costs in the country. But we have almost no understanding of the paths people take to become tertiary care patients, nor of the appropriateness of the decisions made along the way, or the critical issues in preventing the need for such high tech, high cost care.

**How did this situation develop?** Two major historical trends in medicine are responsible. First, the decline of generalist practice, a trend that is now being combated but not with great success. By 1969, only 18% of all physicians were in generalist practice. Second, the relative decline of clinical research. These trends occurred together during the post-World War II era, in part inspired by the demonstrated effectiveness of science during the war. They paralleled the massive growth in the NIH budget and the medical research structure of many American medical schools.

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By the early '60s, several national commissions had identified the need for a generalist physician, and this led to the creation of the family medicine specialty in 1969. This was followed in the mid-'70s by the creation of primary care medicine and pediatrics. From 1963 to 1986 the number of generalist physicians remained static. (In 1963, there were 52.8 generalist physicians per 100,000 Americans; in 1986, there were 53.1.) Generalists take care of about 50% of all visits to physicians in the United States, including 30% by family physicians, and about 10% each for primary care pediatrics and internal medicine. In comparison, the number of office and hospital-based specialists per 100,000 Americans increased from 43.0 to 81.1 (an 89% increase), and from 25.5 to 48.9 (a 92% increase), respectively.[1]

Regarding clinical research, the percentage of NIH investigators with a medical background declined during the past three decades. In 1980 physicians constituted 25% of the NIH applicant pool; by 1989 they had decreased to 20%. Few of the remaining physician-investigators undertake clinical research. Fewer than 60% of applications from physicians involve human subjects, and only about 30% of all NIH-funded projects involve human subjects. Even these overwhelmingly occur in tertiary care clinical research centers or other specialty settings.[2]

The combination of these influences has led to a severe shortfall of the research needed by generalist physicians as well as those who form policy related to their practice and the organization of health care in the United States.

## Origins of Family Medicine

To understand this better, it is useful to review briefly the history of family medicine. Family medicine is the only medical specialty that has emerged because of social need and a political mandate. All other specialties arose out of the progress of science and technology. Over the past two decades, we have created more than 380 family medicine residencies that train 13% of residents in the US.[3] The graduates of these programs are the only group of doctors that regularly settle in rural areas or pursue careers with the underserved. For instance, while about 25% of family physicians go to rural practice settings, fewer than 10% of all other specialties, including primary care pediatrics and internal medicine do so.

The development of the specialty of family medicine has been accompanied by a major academic focus on developing educational activities, and associated residency and university practices. The first and second generation of faculty generally came from practice backgrounds; most had no research training or interest. Only during the '80s has this changed, with the initiation of faculty development programs, a few non-federal fellowships that include some focus on research skill, and the creation of six family practice and primary care federally funded 2- and 3-year research fellowships. Nationally these produce about 25 fellowship graduates a year, 6 to 8 of who are family physicians.

Only during the late 1980s, have a few family medicine principal investigators begun to compete successfully

***ABBREVIATIONS USED:***
***AOM: Acute otitis media***
***AHCPR: Agency for Health Care Policy and Research***
***IOM: Institute of Medicine***
***IPCN: International Primary Care Network***
***LBP: Low back pain***
***NIH: National Institutes of Health***

for federal research funds. The Agency for Health Care Policy and Research (AHCPR) is the only federal agency with a mandate to fund primary care research, although this mandate is not accompanied by a specific budget allocation. Annually the total research funds available to family medicine principal investigators is estimated to be about $10 million, or less than 0.1% of the national medical research budget.

***. . . over the past three decades we have seen a decline in the percentage of NIH investigators who have a medical background.***

**Now, why is it in the national interest that this picture change, and that we produce a vigorous family practice and primary care research enterprise?** Answering this requires an understanding of the content of primary care research, and how it differs from other medical research. Paul Nutting, MD, MSPH, director of the AHCPR Division of Primary Care Research, has identified the research agenda for primary care as one that links clinical, biobehavioral, and health services research.[4] At the core of the model are the patient, the practitioner, the problem, and the clinical process of care by which the patient and practitioner deal with the clinical problem. But this does not happen in a void. The patient is part of a social system, often a family, and it, in turn, is part of a larger community. The practitioner, on the other hand, is part of a practice, and this practice is part of the larger health care system. And all eight of these components — the patient, the practitioner, the problem, the clinical process, and the patient's social system and community, and the physician's practice environment and role in the larger health system — are part of the primary care research framework, since they have bearing on the clinical issues pertinent to primary care practice. An additional dimension is that of time, which involves an understanding of how clinical problems evolve — their natural history, and how the timing of clinical interventions affects this trajectory. Two of the clinical issues mentioned above, otitis media and low back pain, serve as an example of the importance of primary care research.

## Otitis Media

In 1990 otitis media was the third most common diagnosis (essential hypertension and pregnancy were first and second), accounting for 21 million office visits or 3.0% of the 704.6 million total visits made to all US physicians.[5] Pediatricians see 56.5% of acute otitis media (AOM) visits; family physicians/general practitioners, 30.5%.[6] Only 7.2% of AOM visits were to otolaryngologists. For pediatricians, with 12.1 million visits (13.9% of their 87.4 million total visits in 1989) it is second only to "health supervision of infant or child" (which accounted for 12.7 million visits), and far ahead of the third most common diagnosis, acute upper respiratory infection (5.2% of visits).[7] In some community health centers, it is responsible for about a third of all visits.[8]

In 1986 the US Food and Drug Administration found that 42% (44.5 million) of all courses of antibiotics prescribed for children under 10-years-old were for otitis media.[9] The 1980 cost of treating an episode of AOM was estimated at $91 per patient and totaling more than $1 billion per year.[10] Surgical costs for complications of AOM exceed another $1.2 billion annually.[11]

Clearly otitis media is a significant clinical problem. It is disturbing that we are not certain if antibiotics work when given in the primary care setting, we do not know whether all or only some patients benefit from them, we do not know what the proper duration of treatment is for different types of patients, and we do not know how treatment should be tailored for the individual patient.

The International Primary Care Network (IPCN) is a network of general practice and family practice research networks in 14 countries that brings together over 1400 physicians in practice who are willing to collaborate on research. It is coordinated by Larry Culpepper, MD, MPH, and Jack Froom, MD (professor of family medicine at State University of New York at Stony Brook); its international center is located at the Brown University Department of Family Medicine. It conducted an international study of AOM in 1985-86 that enrolled over 4200 patients.[12] Data from this multicountry study of AOM indicate that over 90% of patients from Australia, Great Britain, Israel, New Zealand, Switzerland, and the US are given antibiotics at the initial visit. Exceptions are Belgium where 85% received antibiotics and the Netherlands where only 31.2% of patients received antibiotics.[13]

Recent studies in the United States and abroad have questioned the need for antibiotic treatment of AOM. For example, in the early 1980s van Buchen, conducted a double blind study in the Netherlands and found that only 2.7% of 4860 children age 2 to 12 years old given symptomatic treatment but not antibiotics at their initial visit for AOM continued to have problems as defined by persistent fever, pain or persistent discharge after 3 to 4 days.[14] On follow-up no patients treated without antibiotics developed meningitis; one developed mastoiditis that resolved promptly with antibiotic treatment. On the basis of these studies van Buchen suggests waiting 3 to 4 days prior to instituting antibiotic therapy and then only for those with persistent symptoms. Thus the value of routine universal antibiotic treatment in uncomplicated cases of AOM as practiced in the United States is open to question (however, we do *not* advocate a change in current therapy unless supported by studies in the United States).

***Annually, the total research funds available to family medicine principal investigators is estimated to be about $10 million, or less than 0.1% of the national research budget.***

The above raises the question of which categories of patients (based on findings at the initial visit) are likely to benefit from antibiotic treatment. Most studies in the United States have involved relatively small numbers of

patients, often only 200 or fewer. Since we know that about 85% of primary care patients will recover regardless of therapy, and that the other 15% often fail current therapies, such studies do not involve enough patients destined to have a bad outcome to identify the characteristics of patients that could be used to guide treatment.

The final question, that of optimal duration of antibiotic prescription, also has not been addressed adequately. Current recommendations in the US and several other countries are for a 10-day course of antibiotics for AOM. However, as noted by Bluestone in 1987, "Ten days of treatment is recommended; this duration of therapy has not been determined by clinical trials but has been reasoned from clinical trials involving children with pharyngitis."[15] In our international study, physicians in the US treated 91.8% of cases with a 10-day course.[16] Yet there is evidence internationally from randomized clinical trials that 2, 3 and 5 days courses are as effective as those given for 7 to 10 days.[17-21]

We also have reported information that illustrates the importance of the social and family context of the patient in addressing primary care research questions. Although there was no evidence that they were more severely ill, we found that children in day-care were more likely to visit the physician on the day of the onset of illness and were more likely to be referred immediately for ear tubes or to have received ear tubes in the past than same age children cared for at home. We suspect this is related to the need of working parents to return to work quickly, and for the physician to respond with an intervention perceived effective.[22]

Thus, acute otitis media illustrates how the primary care physician must respond clinically even to the most common childhood morbidity, from a knowledge base inadequate in even the most basic information to guide routine care.

## Low Back Pain (LBP)

LBP serves as a similar example, but one that affects adults and their employers. In the United States it is the number one cause of work loss (1.3 billion days lost); in 1980 it was estimated to cost $16 billion and disable 5.4 million annually.[23,24] LBP is the most common cause of limited activity for those under age 45 and is third behind heart disease and arthritis in those age 45-64;[25] it is the most costly medical problem for those between the ages of 30 and 60.[26] Annual incidence rates for acute LBP of 11% have been reported; 60% to 80% of all adults will have at least one episode during their lifetime. After 3 months, only 5% to 10% of patients continue to have symptoms, although this group accounts for 85% of the costs in terms of compensation and loss of work.[27] Clearly low back pain is an important problem.

***. . . there was no significant difference in pain score for patients with low back pain who had no further contact with their general practitioner or specialist, in comparison with those who did.***

Once a patient has been categorized as having chronic LBP, prognosis is poor. Even with aggressive approaches, rehabilitation of the chronic LBP patient often is not possible;[28] 1-year success rates of about 50% have been reported in the most successful programs, which have highly selected patients.[29,30] Therefore, successful intervention during the acute phase, prior to progression to a chronic condition, is highly desirable.

Yet, the determinants of progression from acute to chronic LBP disability are poorly understood. Investigations of progression generally have used patient samples drawn from those already with established chronic LBP, thus making cause/effect conclusions suspect. In 1986 the Institute of Medicine (IOM) Committee on Chronic Pain and Disability concluded: "Faced with a new case [of acute LBP], the clinician or investigator currently has no way of knowing whether that person is likely to go on to chronic status or not. Cohort studies can help answer some of these questions and generate focused hypotheses for other types of studies. Most important, they could point the way to designing preventive measures and directing therapeutic efforts."[31]

Where do LBP patients seek care? Most patients with acute LBP see a primary care physician, only a minority ever see a specialist. The National Ambulatory Medical Care Surveys found that in 1980-81 there were 10 million visits for new episodes of LBP;[32] 61% of patients saw primary care physicians, 28% saw surgeons and surgical subspecialists. It was the second most common adult diagnosis for generalist physicians.

Primary care physician referral patterns for LBP are poorly understood. Little is known about the impact of referral on outcome, utilization, and cost. We do know that in the search for the cause and a way of relieving LBP, tests, treatments, and referrals often do not help or make it worse. A breakdown in basic trust may result, which strains the doctor-patient relationship and leads patients to seek alternative care.

Lack of ongoing contact with physicians does not reliably indicate improvement. In a random sample of all Dutch general practices,[33] 96% of acute LBP patients completed a follow-up study. At first contact, 11% were referred and during the 1-month follow-up, 33% had one or more follow-up contacts with their GP, 56% had no follow-up. Of note, at 1 month, there was no significant difference in pain score for patients with LBP who had no further contact with their general practitioner or a specialist, in comparison to those that did. Overall, only 28% of all patients were pain-free.

What information is available to the family physician to guide treatment? Virtually all studies of the treatment of acute LBP have used symptom relief as their endpoint rather than progression to chronic disability. Generalist physicians have little guidance concerning the value and appropriate timing of various diagnostic approaches. Few treatments have been shown to be very effective when used in primary care.

An axiom in medical practice is that when numerous therapies exist, perhaps none really work. Deyo[34] identified numerous therapies for LBP: bed rest or restricted activity;[34] oral drugs (analgesics, muscle relaxants and anti-depressants);[35] exercises,

physical therapy (cold, heat, and massage);[36] corsets;[37] traction;[38] manipulation;[39] trigger point injections and stretch and spray;[38,40] epidural or parenteral steroid injections;[41] chymopapain injections;[42] diathermy;[36] transcutaneous nerve stimulation, biofeedback and behavioral modification;[43] and, surgery. Deyo's excellent review of conservative therapy for acute LBP found few credible studies and no clear superiority of any treatment.[34] Few have been tested for efficacy in double-blind studies. Surgery for acute sciatica results in effective relief of leg pain in 95% of patients; however, at 2 years surgical and non-surgical treatments have no difference in outcomes.[44] Thus both the determinants of progression from acute to chronic LBP and the value of common therapies for acute LBP are poorly understood.

***An axiom in medical practice is that when numerous therapies exist, perhaps none really work.***

LBP exemplifies the importance of understanding the generalist physician's role in the health care system. One group studied the accuracy and influence of physician prognosis; their study was not restricted to LBP.[45] The predictive value of a poor prognosis was 0.571 and of a good prognosis 0.785. With respect to LBP, the predictive values were 0.667 and 0.773. Cost of care was more closely associated with physician expectation than actual outcome. For those who experienced a poor outcome, the cost of care was $33.05 (in 1982) for those who the physicians had predicted a poor outcome and $21.36 for those whose outcome was expected to be good. With good outcomes, the corresponding costs were $26.48 and $19.83.

LBP also illustrates the importance of both the patient's immediate social setting, and relationship to the larger community. The concept of illness behavior is of relevance. "Illness behavior is a process that includes a perception of one's own symptoms, and attribution of meaning to them, and the way in which one seeks help in dealing with the symptoms. Such behavior is influenced by the person's personality and coping style and by the surrounding culture and society."[31] The experience of chronic pain includes fears about the future, work loss, threats to family and priorities of daily life.

Perception of LBP as a symptom of ill health involves categorizing the experience and assigning meaning to it, a process intertwined with values and beliefs.[46] Meaning is associated with a sense of purpose and coherence about life events. For some, a sense of self-mastery over a problem is improved by the ability to assign meaning to it.[47] As a result the limitation imposed on the patient's lifestyle by LBP may be little if the patient believes that he or she can control pain and despite the pain do activities without harm.[48] In contrast, those who feel they have little or no control over their pain are less likely to achieve rehabilitation.[49] The personal meaning of LBP may be affected by self-esteem, which in turn may be related to employment status. The meaning symptoms are given may affect their subsequent intensity and duration, help-seeking behavior, and whether the person sees him or herself as sick, and deserving disability benefits.[50,51]

Not surprisingly, the disability system, and the patient's relationship to it have major influence on the course of LBP. Some countries, including the United States, use systems relying on medical determination of disability to restrict eligibility, although the determination really concerns the fundamental issues of who deserves social aid. For example, in the US, a person is judged disabled only if, because of physical or mental impairments, "he is not only unable to do his previous work but cannot, considering his age, education and work experience, engage in any kind of substantial gainful work which exists in the national economy, regardless of whether such work exists in the immediate area where he lives, or whether a specific job vacancy exits for him, or whether he would be hired if he applied for work."[52] To qualify for Medicare disability benefits, including rehabilitation, a physician must certify that the patient has been disabled for at least 6 months, and is expected to be disabled for at least another 12 months. This places the physician in the position of both certifying, for a government program, a patient's permanent disability and simultaneously working to provide rehabilitation.

In contrast, European disability policies focus on the assessment of earning ability rather than on strict medical criteria.[53] Individuals need not be totally incapable of earning a living to qualify for benefits. For example in Germany, disability is defined as the inability to earn a fixed amount of money by doing one's previous job or another job that corresponds to one's capabilities and education and that does not entail a significant decline in social status. Eligibility for permanent disability benefits usually is determined only after prolonged rehabilitation efforts. Another difference is that in most European countries the health, unemployment, disability, and retirement insurance systems are coordinated and may be linked to rehabilitation, including job training.

The IPCN currently is embarking on an AHCPR-funded study that will follow 1000 patients in each of three countries (United States, Great Britain, and Israel) from their first visit for a new episode of acute LBP. This study will identify which patient characteristics, treatments, and aspects of the patient's relationship to his or her country's disability system, to begin to answer some of the questions of

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interest to family physicians caring for LBP in their daily practice.

## Little to Guide Clinician

These two examples provide insight into the importance of primary care research, and why we should build a vigorous primary care research community nationally. In virtually every area of the practice of generalist medicine, when we critically examine the literature, we find little to guide the practitioner. What information is available is often of dubious applicability to generalist practice, having been derived from highly selected populations in tertiary care settings. We do not have a scientific basis for most of the diagnostic and therapeutic activities that occur in primary care. Also, while substantial literature is available on the care of hospitalized and tertiary care patients, we do not understand how patients have come to need such care, or how the problems requiring such care might have been prevented at an earlier stage of illness Changing this will require a substantial increased commitment to train primary care researchers, and accepting the primary care research agenda as a priority for medical research nationally.

***. . . while substantial literature is available on the care of hospitalized and tertiary care patients, we do not understand how patients have come to need such care or how the problems requiring such care might have been prevented . . .***

This article has not discussed those aspects of primary care research related to the organization and delivery of care, and the interface of primary care with specialty care. In these areas our knowledge gaps are as substantial, and the impact as major. An expansion of the primary care knowledge base could greatly improve our efforts in moving toward a rational health system in the United States, as well as improving the day to day care that occurs during the more than 1.35 million generalist office visits each day in the United States.

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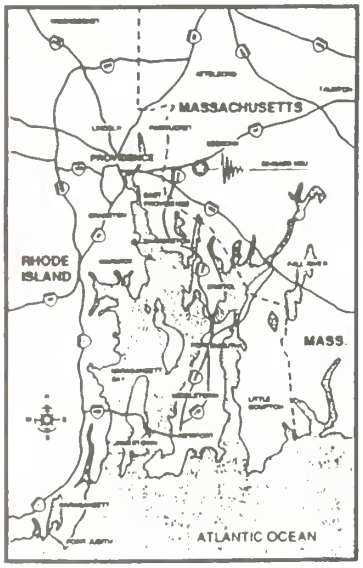


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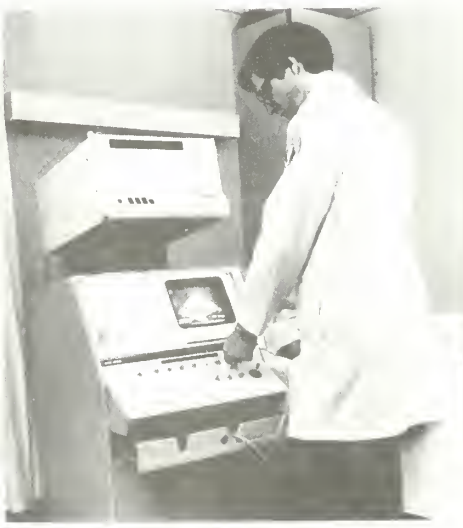

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# Family Income and Mortality Rates: An Updated Analysis of the National Mortality Followback Survey

Wilfred L. Rosenbaum, MMath
Theodor D. Sterling, PhD
James J. Weinkam, DSc

***While there is evidence that the influence of low-income on mortality may be decreasing in the US, there remains a strong association between health and wealth.***

Numerous studies have reported strong associations between income level and mortality from heart disease and cancer. To assess the constancy of this association across other forms of disease, Frenkel and Aronson[1] used data from the 1966-68 National Mortality Followback Survey[2] to examine the effect of family income on mortality from four broad classes of disease: infectious diseases, arterial diseases, environmentally influenced malignant neoplasms and malignant neoplasms not yet thought to be influenced by environmental factors. They found that, generally, disease-specific mortality rates were inversely proportional to reported family income, and the effect of income decreased with age. However these findings were based on data that do not reflect the recent effects of government health intervention plans such as Medicare and Medicaid. The purpose of this study is to use more recent data to investigate possible changes in the effect of income on mortality for the same disease classes used by Frenkel and Aronson.

## Methods

Data for our study come from the 1986 National Mortality Followback Survey (NMFS)[3] and the 1986 National Health Interview Survey (NHIS).[4] The 1986 NMFS is the fifth mortality followback survey conducted by the National Center for Health Statistics (NCHS); the previous four, conducted in the 1960s were less comprehensive. The 1986 NMFS was based on a stratified probability sample of 18,733 death certificates of persons age 25 years or older who died in the United States during 1986. A questionnaire was sent to the informant listed on the death certificate (who was usually a family member or close acquaintance) to obtain further information about the decedent. The questionnaire and subsequent telephone and mailing follow-up resulted in an overall response rate of 89%. The stratification criteria used by the 1986 NMFS were racial origin, cause of death and within certain causes, age of death. Within strata, sampling rates are known. In contrast to earlier versions of the NMFS, the 1986 NMFS did not impute family income levels to those decedents for whom this information was not available.

The NHIS collects health-related information from members of a nationwide probability sample of households. Each week a sample of households is selected from the civilian, non-institutionalized US population using a multistage cluster design in such a way that each weekly sample is representative of the target population and the weekly samples are additive over time. In 1986, the NHIS obtained information from a sample of 24,698 households composed of 62,052 persons. (Due to budgetary constraints, NCHS was forced to reduce the sample size of the 1986 NHIS from the approximately 110,000 persons interviewed in other years.)

Persons from the NHIS and NMFS were classified according to age (35-44, 45-54, 55-64, 65-74 and 75-84 years) and family income (<$11,000, $11,000 to $25,000 and $25,000+). This income classification roughly parallels the family income classification (<$3,000, $3,000 to $9,999 and $10,000+) corrected for inflation used by Frankel and Aronson to classify the 1966 population. In addition, decedents from the NMFS were classified according by underlying cause of death. Table 1 gives the complete definition of the four broad cause of death categories used by Frenkel and Aronson and in this study.

The NMFS and NHIS data thus provide a snapshot of the cross-classification of the entire 1986 US population at risk and also of those persons who died during the year. Use of these permit estimation of national age and income level specific mortality rates and of the corresponding relative risks. Further details on using simultaneous surveys to obtain such risk estimates including methods for obtaining confidence intervals may be found in [5]

## Results

Table 2 presents the age-specific mortality rates by income level for each of the four cause-of-death groups, revealing a number of interesting patterns. As expected, mortality rates in-

***ABBREVIATIONS USED:***
***NCHS: National Center for Health Statistics***
***NHIS: National Health Interview Survey***
***NMFS: National Mortality Followback Survey***

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Table 1.—Cause of Death Groups and International Classification of Diseases—Ninth Revision Codes

**Group A: Selected infectious, parasitic and granulomatous diseases:**
Respiratory infections, non-tuberculosis
- Asthma (493)
- Influenza (487)
- Pneumonia. (480-486)
- Bronchitis (466,490-491)

Non respiratory infections, non tuberculosis
- Septicemia (038)
- Meningococcal infections (036)
- Viral hepatitis (070)
- Meningitis (320-322)
- Infections of kidney (590)

Chronic infections, tuberculous, parasitic and granulmatous
- Tuberculosis of respiratory system (010-012)
- Tuberculosis, other forms (013-018)
- Syphilis and other venereal disease (090-099)
- Other infectious and parasitic diseases (001-009, 020-027, 030-035, 037, 039-041, 045-066, 071-088, 100-139)

**Group B:Selected hypertensive, cardiovascular, and cerebrovascular diseases anti diabetes mellitus**
Hypertensive, cardiovascular diseases
- Hypertensive diseases (401-405 )
- Ischemic heart disease (410-415 )
- Atherosclerosis (440)
- Diseases of arteries, arterioles and capillaries (440-448)
- Diseases of veins and lymphatics, and other diseases of the circulatory system (451-459)
- Cerebrovascular disease (430-438)
- Diabetes mellitus (250)

**Group C-1: Selected neoplasms, not associated with environmental factors**
- Malignant neoplasm of digestive organs and peritoneum (150-159)
- Malignant neoplasm of female breast (174)
- Malignant neoplasm of genital organs (179,187)
- Malignant neoplasm of other and unspecified sites (190-199)
- Malignant, neolp1asm of lymphatic and hematapoietic tissue (200-209)

**Group C-2: Selected neoplasms, associated with environmental factors**
- Malignant neoplasm of lip,oral cavity and pharynx (140-149)
- Malignant neoplasm of respiratory system and intrathoracic organs (160-165)
- Malignant neoplasm of urinary organs (188-189)

crease with increasing age and show a declining dose-response relationship with increasing family income level. Generally, for groups A, B and C-1, mortality rates have decreased from 1966 to 1986, with the most substantial decreases occurring in the low income group. Only for the group of environmentally influenced malignant neoplasms C-2, have the mortality rates increased. This increase occurs across all income groups.

Table 3 presents the age-specific relative risks (low income compared to high income, referred to as the income differential by Frenkel and Aronson) from 1966 and 1986 for each cause group. Again a similar pattern for cause groups A, B and C-l emerges. Relative risks among the youngest members of these groups (age 35-54) have significantly decreased from 1966 to 1986. There is no significant change in relative risk among those age 55-84. For cause group C-2 no significant change in relative risk occurred for any age group. The relative risks also decrease with age for all cause groups, though the effect is not as pronounced as in 1966.

## Discussion

Although the Frenkel and Aronson investigation was somewhat restricted in its scope *(eg* such as no control for race and sex) we have followed the same procedure to ensure comparability of results.*

The dramatic decreases in relative risks that are in the younger age groups (age 35-44 and age 45-54) in groups A, B and C-1 reflect the sharp decline in mortality rates among the lowest income level members. These lower mortality rates may well reflect the effect of improved social programs aimed at providing better health care to less privileged groups.

The increase in environmentally influenced cancer mortality rates across all levels of income suggests a change in exposure to environmental carcinogens has occurred. If there is a 20-year lag period between exposure and onset of mortality, this would indicate that persons alive in the mid-1960s were exposed more heavily to environmental carcinogens than persons in the mid-1940s.

One limitation of this approach to risk analysis is its reliance on mortality data. A decrease in estimated disease mortality rates from 1966 to 1986 reflects a decrease in incidence from the disease, a change in disease classification, an increase in disease survivorship (ie, improved treatment) or some combination of these factors. The cross-sectional design employed here does not allow us to distinguish which factors are operating.

Many recent epidemiological studies have shifted the focus of social causes of disease from class to the socio-economics of income. The belief is that as the wealth of an individual or of a nation increases additional monies will be spent on healthful practices such as better nutrition, preventive health care and so on. While there is evidence that the influence of low income on mortality may be decreasing in the US, there remains a strong association between health and wealth.

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* A more complete analysis of 1986 mortality rates adjusting for a number of demographic and lifestyle confounders is the subject of a forthcoming paper.

Table 2.—Age Specific Mortality Rates per 100,000 Persons by Family Income Level from 1966 and 1986 and 95 Percent, Confidence Intervals for 1986 Rates

| | 35-44 | 45-54 | 55-64 | 65-74 | 75-84 |
|---|---|---|---|---|---|
| **Group A: Infectious and Parasitic Diseases** | | | | | |
| **High** | | | | | |
| 1966 | 0.4 | 1.0 | 3.3 | 16.5 | 15.4 |
| 1986 | 0.4 | 0.8 | 1.2 | 5.1 | 20.8 |
| C.I. | (2.6) | (.3,1.2) | (.2,2.1) | (2.1,8.1) | (10.4,31.2) |
| **Medium** | | | | | |
| 1966 | 1.7 | 3.0 | 6.2 | 13.9 | 33.9 |
| 1986 | 1.4 | 1.3 | 4.1 | 5.8 | 28.7 |
| C.I. | (.8,1.4) | (.4,2.2) | (1.9,6.3) | (2.5,9.2) | (19.2,38.2) |
| **Low** | | | | | |
| 1966 | 9.2 | 14.4 | 14.9 | 23.9 | 38.6 |
| 1986 | 2.3 | 2.2 | 5.1 | 6.5 | 29.8 |
| C.I. | (1.2,3.3) | (0.4,4.0) | (1.8,8.5) | (1.4,11.6) | (18.0,41.5) |
| **Group B: Heart, Diseases and Diabetes** | | | | | |
| | **35-44** | **45-54** | **55-64** | **65-74** | **75-84** |
| **High** | | | | | |
| 1966 | 3.5 | 12.3 | 47.9 | 128.8 | 337.1 |
| 1986 | 1.5 | 5.9 | 23.2 | 53.5 | 183.4 |
| C.I. | (1.3,1.7) | (4.9,7.0) | (19.1,27.4) | (43.1,63.8) | (144.9,221.9) |
| **Medium** | | | | | |
| 1966 | 10.0 | 34.5 | 76.8 | 162.6 | 468.9 |
| 1986 | 4.0 | 16.9 | 41.2 | 82.4 | 209.9 |
| C.I. | (3.3,4.7) | (13.4,20.5) | (33.7,48.7) | (45.3,115.6) | (177.5,242.3) |
| **Low** | | | | | |
| 1966 | 30.9 | 76.6 | 129.3 | 209.2 | 426.5 |
| 1986 | 5.0 | 19.2 | 49.2 | 95.6 | 208.5 |
| C.I. | (3.9,6.1) | (13.7,24.7) | (38.1,60.3) | (37.6,153.6) | (170.4,246.7) |
| **Group C-I: Non Environmentally Associated Cancers** | | | | | |
| | **35-44** | **45-54** | **55-64** | **65-74** | **75-84** |
| **High** | | | | | |
| 1966 | 2.5 | 7.4 | 15.9 | 46.0 | 75.0 |
| 1986 | 2.1 | 6.3 | 17.4 | 29.0 | 48.2 |
| C.I. | (1.7,2.5) | (5.1,7.5) | (13.2,21.0) | (21.5,36.5) | (31.8,64.7) |
| **Medium** | | | | | |
| 1966 | 6.2 | 13.7 | 28.7 | 53.1 | 87.4 |
| 1986 | 4.1 | 11.6 | 26.0 | 41.3 | 81.6 |
| C.I. | (3.2,5.1) | (8.6,14.6) | (20.1,31.8) | (24.0,58.7) | (64.1,99.0) |
| **Low** | | | | | |
| 1966 | 11.0 | 25.4 | 39.6 | 63.5 | 78.3 |
| 1986 | 3.6 | 14.0 | 31.1 | 46.6 | 84.4 |
| C.I. | (2.3,4.9) | (9.I,18.9) | (22.3,39.8) | (17.5,75.6) | (63.0,105.7) |
| **Group C-2: Environmentally Associated Cancers** | | | | | |
| | **35-44** | **45-54** | **55-64** | **65-74** | **75-84** |
| **High** | | | | | |
| 1966 | 0.7 | 1.9 | 6.9 | 15.7 | 13.6 |
| 1986 | 0.5 | 2.1 | 8.7 | 14.4 | 32.9 |
| C.I. | (0.3,0.7) | (1.4,2.8) | (6.1,11.3) | (8.9,19.1) | (19.3,46.5) |
| **Medium** | | | | | |
| 1966 | 1.1 | 5.6 | 12.7 | 16.9 | 23.4 |
| 1986 | 1.1 | 10.1 | 19.8 | 26.3 | 25.5 |
| C.I. | (0.6,I.6) | (7.3,13.0) | (14.7,24.9) | (14.7,37.8) | (16.4,34.9) |
| **Low** | | | | | |
| 1966 | 3.3 | 14.1 | 15.9 | 18.0 | 22.3 |
| 1986 | 1.2 | 11.8 | 21.5 | 32.1 | 30.4 |
| C.I. | (0.5,2.0) | (7.4,16.2) | (14.3,28.7) | (11.7,52.6) | (18.3,42.6) |

Table 3.—Age Specific Relative Risks from 1966-68 and 1986 and 95 Percent, Confidence Intervals for 1986 Relative Risks

| | 35-44 | 45-54 | 55-64 | 65-74 | 75-84 |
|---|---|---|---|---|---|
| **Group A: Infectious and Parasitic Diseases** | | | | | |
| 1966 | 23.00 | 14.40 | 4.52 | 1.45 | 2.51 |
| 1986 | 5.57 | 2.86 | 4.36 | 1.27 | 1.43 |
| C.I. | (2.98,10.42) | (1.06,7.77) | (1.55,12.27) | (0.48,3.39) | (0.76,2.70) |
| **Group B: Heart Diseases and Diabetes** | | | | | |
| | 35-44 | 45-54 | 55-64 | 65-74 | 75-84 |
| 1966 | 8.83 | 6.23 | 2.70 | 1.62 | 1.27 |
| 1986 | 3.31 | 3.23 | 2.12 | 1.79 | 1.14 |
| C.I. | (2.53,4.32) | (2.30,4.54) | (1.59,2.83) | (0.95,3.38) | (0.86,1.50) |
| **Group C-1: Non Environmentally Associated Cancers** | | | | | |
| | 35-44 | 45-54 | 55-64 | 65-74 | 75-84 |
| 1966 | 4.40 | 3.43 | 2.49 | 1.38 | 1.04 |
| 1986 | 1.73 | 2.23 | 1.79 | 1.61 | 1.75 |
| C.I. | (1.15,2.60) | (1.50,3.31) | (1.26,2.55) | (0.82,3.15) | (1.14,2.68) |
| **Group C-2: Environmentally Associated Cancers** | | | | | |
| | 35-44 | 45-54 | 55-64 | 65-74 | 75-84 |
| 1966 | 4.71 | 7.42 | 2.30 | 1.15 | 1.64 |
| 1986 | 2.46 | 5.69 | 2.47 | 2.29 | 0.92 |
| (C.I. | (1.18,5 12) | (3.45,9.39) | (1.58,3.87) | (1.10,4.87) | (0.52,1.64) |

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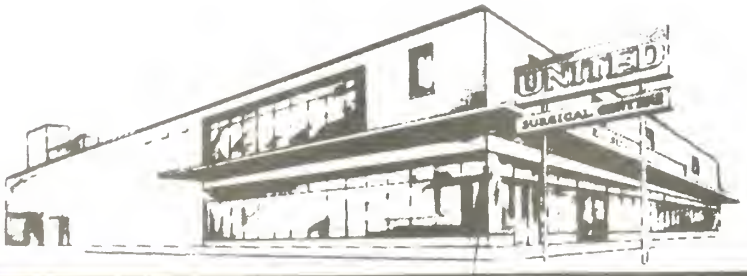


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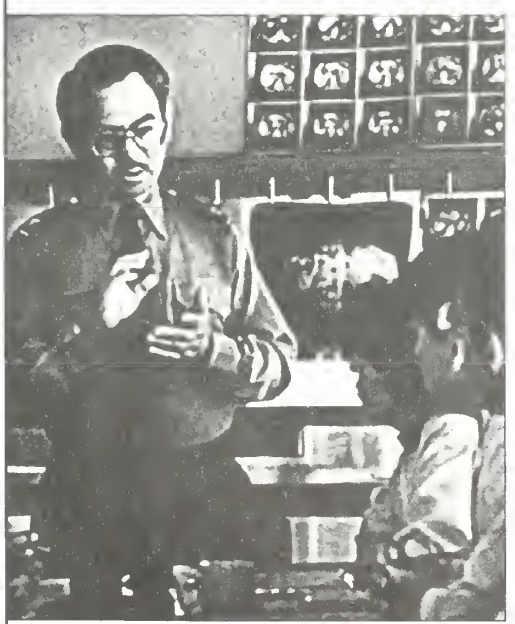

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# Preventing Premature Mortality

In *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*, three broad goals are presented as the basis for setting national public health priorities during the 1990s:[1]

- Increase the span of healthy life for Americans
- Reduce health disparities among Americans
- Achieve access to preventive services for all Americans

The first goal "encompasses the essential elements of health promotion and disease prevention: prevention of premature death, disability, and disease, and enhancement of the quality of life."[1]

During this century, there have been great advances in increasing the lifespan of the average American, first through reductions in mortality from infectious diseases, and more recently through reductions in mortality from chronic diseases such as heart disease, stroke, chronic liver disease, and some cancers, and from injuries, including unintentional injuries ("accidents"), suicide, and homicide. As of 1989, the life expectancy at birth in this country was over 75 years, and a person age 65 could expect to live until age 82, on average.[2]

Nevertheless, there are still many deaths that occur to persons under age 65 and are considered premature from social, economic, familial, and other perspectives. In 1989, there were 2203 deaths of persons under age 65 (23.1%) among the 9550 deaths of Rhode Island residents. In this group, the leading causes of death, in order, were malignant neoplasms; diseases of the heart; injuries, including intentional and unintentional; perinatal conditions; cerebrovascular diseases; chronic liver disease and cirrhosis; AIDS; and chronic obstructive pulmonary diseases (COPD). (Figure 1) No other cause of death represented as much as 2.5% of the total.

The distribution of causes of death is different for age groups within those under age 65. (Table 1) The chronic diseases strongly dominate mortality among those ages 45-64, injuries and AIDS deaths peak in the middle group, and the youngest age group is at greatest risk of dying from injuries and from perinatal conditions (perinatal conditions by definition strike those under one year of age).

Death rates from all the leading causes except AIDS have declined among those under age 65 in Rhode Island over the ten years from 1979 to 1989. Overall, the number of deaths in this group decreased from 2549 in 1979 to 2203 in 1989, while the population increased from 820,000 to 853,000; the crude death rate from all causes declined by 17%. Death rates from all leading causes except AIDS showed declines of between 8 and 37% during the decade. (Figure 2; AIDS is excluded as there were no deaths in 1979.) The largest percentage declines were for two chronic conditions, diseases of the heart and chronic liver disease and cirrhosis; perinatal conditions and cerebrovascular diseases also declined at more than the average rate.

Much of the decline in premature mortality over the past decade can be attributed to a variety of prevention activities. Reduced smoking rates directly affect the risk of mortality from heart disease, cerebrovascular disease, COPD, and some cancers. Improved dietary practices and increased participation in regular exercise reduce the likelihood of many of the same diseases. Injury prevention activities, most notably tougher drunk driving laws, lower speed limits, and the increased use of automobile passenger restraints, have prevented many deaths among young people during this period. Nonetheless, the majority of premature deaths that are still occurring are from illnesses and injuries that are largely preventable with today's epidemiologic knowledge and technology. To reduce premature mortality to the targets set for the Year 2000, and provide all Americans with an increased span of healthy, productive life, will require an ever-increasing emphasis on prevention in health policy.

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*Submitted by William J. Waters, Jr., PhD, and Jay S. Buechner, PhD, Office of Health Statistics, Rhode Island Department of Health.*

Table 1.—Number of Deaths by Cause of Death and Age Group, Ages 0 - 64 Years, Rhode Island, 1989.

| Cause of Death | Age Group (Years) 0 - 24 | 25 - 44 | 45 - 64 | 0 - 64 |
|---|---|---|---|---|
| Malignant Neoplasms | 13 | 76 | 600 | 689 |
| Diseases of the Heart | 7 | 43 | 430 | 480 |
| Injuries | 106 | 152 | 77 | 335 |
| Perinatal Conditions | 78 | 0 | 0 | 78 |
| Cerebrovascular Diseases | 1 | 20 | 52 | 73 |
| Chronic Liver Disease and Cirrhosis | 0 | 13 | 53 | 66 |
| AIDS | 4 | 44 | 10 | 58 |
| Chronic Obstructive Pulmonary Diseases | 2 | 3 | 49 | 54 |
| All Other Causes | 93 | 68 | 209 | 370 |
| Total | 304 | 419 | 1480 | 2203 |

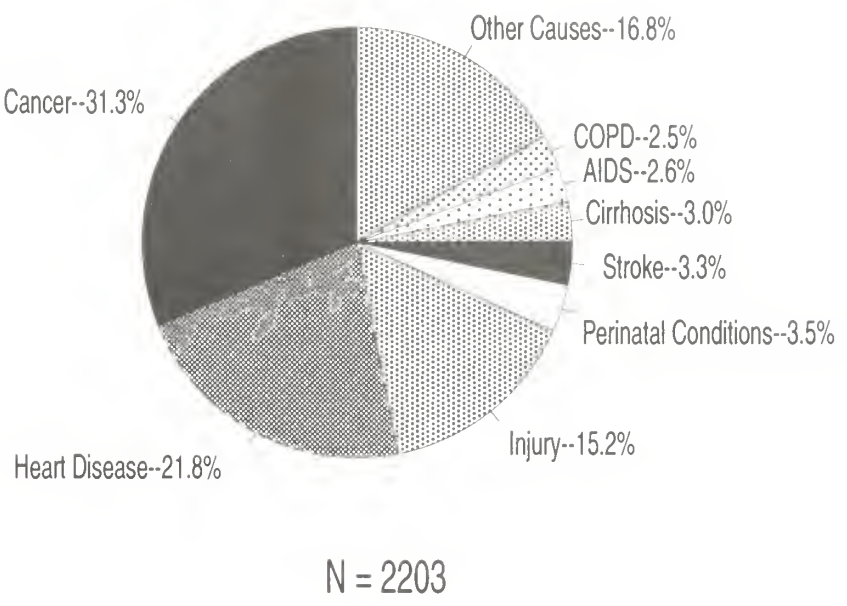


Fig 1.—Percentage Distribution of Cause of Death, Ages 0 - 64 Years, Rhode Island, 1989.

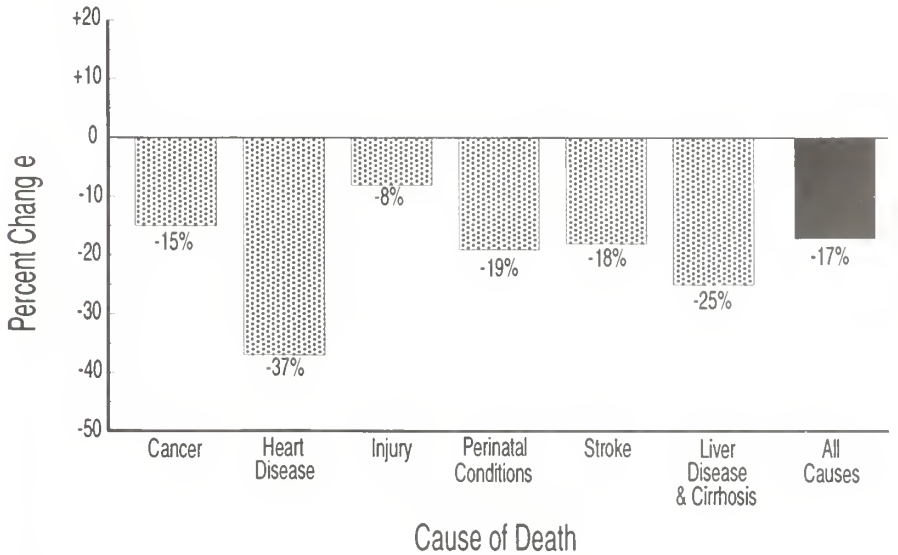


Fig 2.—Percentage Change in Mortality Rate from 1979 to 1989, by Cause of Death, Ages 0 - 64 Years, Rhode Island.

THE RHODE ISLAND MEDICAL JOURNAL

The Official Organ of the Rhode Island Medical Society
Issued Monthly under the direction of the Publication Committee

VOLUME I
NUMBER I

PROVIDENCE, R. I., JANUARY, 1917

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# THE RHODE ISLAND MEDICAL JOURNAL HERITAGE

## 90 Years Ago
## June 1903

William B. Cutts, MD, provides the readers with a comprehensive review of the history, etiology, clinical manifestations and prophylaxis of the bubonic plague. The author speculates that the 2nd century plague-like illness described in the middle east by Rufus (a physician from Ephesus) was indeed bubonic plague. The great plague of Justinian, originating in Egypt in 542 AD and spreading to Europe, in the judgment of the author, was probably also bubonic plague. The author then describes the great wave of pestilence that spread throughout Europe during the 14th century, the epidemic sometimes called the Black Death, which caused the deaths of at least a quarter of the population. After 1720, western Europe remained essentially free of plague (except for rare cases confined to seaports) but Russia and Turkey continued to be endemic for plague with occasional bursts of epidemic spread. Large numbers of cases were recorded in Russia as recently as 1879. In March 1900, 93 cases emerged in San Francisco, 89 of which were fatal. Certain Pacific coast ports of Mexico were similarly affected. The causative microorganism, discovered in 1894 by Yersin and Kitasato each working independently in Hong Kong, bears the name Bacillus pestis bubonicae *(The current name of the organism is Yersinia pestis named after Alexandre Yersin.—Ed)* Cutts describes instances of laboratory scientists accidentally infecting themselves when working with the organism. There then follows an excellent description of the signs, symptoms, progression and prognosis of the disease, as well as a commentary on preventive measures and rat control. He concludes prophetically, "In the light of modern investigations and experience, it does not seem likely that the enlightened nations of the earth will ever experience again the devastating effect of the scourge, as it appeared in the middle ages. The problem resolves itself then into a struggle against indolence, ignorance and filth and just in proportion as these are overcome will the plague cease to decimate the nations of the earth."

Daniel S. Latham, MD, describes a case of ante-partum hour-glass contraction of the uterus. The patient was a 33-year-old primipara, whose pregnancy had progressed without mishap. After a labor interval of more than 75 hours, it required 4 hours of intense effort by two obstetricians to complete a delivery but with loss of the fetus. The mother made a good but slow recovery.

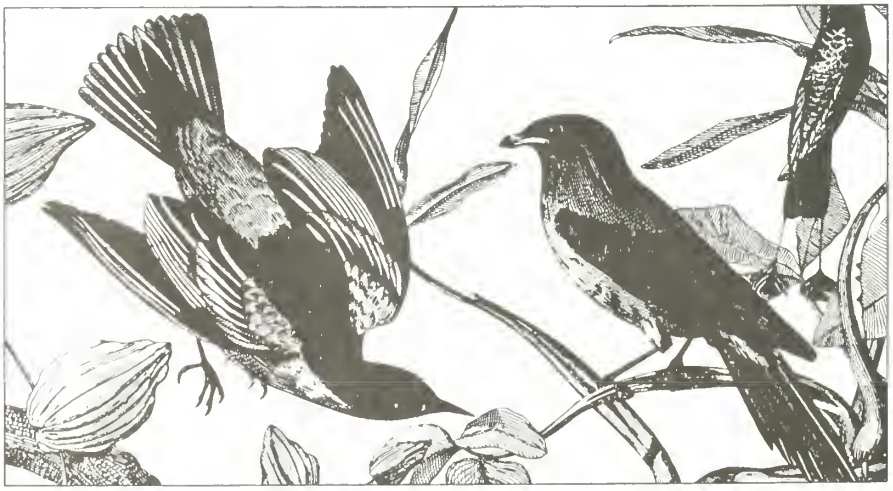
A case of hemopericardium in a 9-year-old girl is described by W.E.Wilson, MD. The patient had a needle driven into her chest 5 months before the acute episode. (No further information on this "injury" is provided.) The child, when first seen, was dyspneic, cyanotic and markedly emaciated. Heart sounds could not be heard. Under local cocaine anesthesia, a "medium-sized needle" was extracted. Four days later 6 ounces of bloody fluid were aspirated by a needle through the fourth intercostal space. The child died 20 hours later, and no autopsy was performed.

The yearly report on the Society's library is provided. Total bound volumes now total 15,359, including 1,597 new acquisitions during the prior year.

The annual treasurer's report of the Rhode Island Medical Society indicates receipts of $1,433.40 and a net balance of $577.56. The total membership is 289 physicians.

## 50 Years Ago
## June 1943

The lead article discusses sex hygiene in the US Navy and is written by LCDR E.C.Smith, MC. In discussing the inevitability of sexual preoccupation by members of any military organization, the author notes that



"from time immemorial Venus and Mars have gone hand in hand." The armed forces of this country, mindful of the lessons learned in World War I, have adopted a stringent educational, preventive and therapeutic program to control venereal disease in the military - as well as those civilian populations in contact with military concentrations. In World War I, 7,492,510 service days were lost to the armed forces as a result of venereal disease. Before the new program was adopted by the military services, the annual VD admission rates had been 80.3 per thousand. By 1942, the rate had dropped to 36 per 1000. To achieve control, the services trained a number of their physicians in the elements of venereal preventive medicine; maintained an extensive education program through lectures, counseling and pamphlets; established prophylactic stations in urban centers leg, railroad terminals) for the distribution of condoms and to provide chemical treatment after exposure. The major problem, the author acknowledges, is the careless, intoxicated sailor who will not take advantage of such Pro-Stations. He also notes that "Effective control of venereal disease requires the closest cooperation between the service and the civilian health organizations."

The Journal publishes the report of the state chairman for procurement and assignment of physicians. The committee is composed of Drs. DeWolf, Kingman, Hussey, Gormly, and Buffum. Hospital staffs, since the onset of hostilities, have been depleted by 30% to 50%, but yet the hospitals are functioning reasonably well. In early 1942, there were about 950 physicians in Rhode Island of which 850 could be considered in active practice. There were 396 below the age of 45. In 1942, 186 were given commissions in the armed services. For 1943, procurement of an additional 70 physicians will be needed.

It was voted by the Council of the Society that the monthly publication of the Providence Medical Society, *Medical News,* be incorporated into the *Journal* and that the combined publication be managed by Dr Chase and Mr Farrell.

The annual Secretary's report indicates that the membership stands at 596 (with 132 in the armed forces.) The previous year saw 49 new members join the Society.

### 25 Years Ago
### June 1968

Stanley D. Davies, MD, president of the Rhode Island Medical Society, discusses the future of the private practice of medicine, calling the shortage of general practitioners a matter of national concern that will require new and creative approaches. He expresses guarded optimism about the future but implores his colleagues to remember that service to the sick is their primary concern. He quotes Osler: "Live neither in the past nor in the future, but let each day's work absorb your entire energies and satisfy your widest ambition."

Howard S. Sturim, MD, describes the treatment of children with prominent, protruding ears. After summarizing the surgical procedure, he states: "In children who have undergone this operation, the psychic trauma appears to be definitely improved with a noticeable improvement in their social adjustment. There is usually a sound motivation on the part of the patient and the parents to acquire correction of this deformity, and it is gratifying to be able to make these corrections without serious hazard."

Mrs. Thomas F. Head describes the 21st year of the Society's Woman's Auxiliary and the outstanding record it has compiled.

The new officers of the Medical Society are: Drs John J. Cunningham, Peter C.H. Erinakes, Stanley D. Simon, Stephen J. Hoye, John A. Dillon, Seebert J. Goldowsky and Edmund T. Hackman.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To expedite production and ensure accuracy, authors are **strongly encouraged** to submit articles as well as computer-generated tables and figures on floppy diskette, formatted in any major MS-DOS or Windows word processor (eg, Microsoft Word, Wordperfect, Wordstar, Xywrite, Multimate, etc.) Macintosh disks will be accepted provided text is saved in an ASCII file. If possible, Macintosh disks should be saved in DOS format, using Apple File Exchange. Diskettes must be accompanied with at least one printed copy of the manuscript. Diskettes will be returned upon request.

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**Journal Article:**

1. Feinfeld DA, al-Achkar G, Lipner HI, Chirayil SJ, Hakim J, Avram MM. Syndrome of inappropriate secretion of antidiuretic hormone: Association with cavernous sinus thrombosis. *JAMA*. 1978;240:856-857.

**Books:**

2. Hollingworth JW. *Local and Systemic Complications of Rheumatoid Arthritis*. Philadelphia, Pa: Saunders; 1968.

**Book Chapter**

3. Epstein WL. Erythema nodosum. In: Samter M, ed. *Immunological Diseases*, 2nd ed. Boston, Mass.: Little, Brown; 1971;2:944-951.

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**Identification of Patients** - Names and initials should not be used. When discussing individual patients use numbers (ie, Patient 1, Patient 2, etc.).

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**PRAVACHOL® (Pravastatin Sodium Tablets)**

**CONTRAINDICATIONS**

Hypersensitivity to any component of this medication

Active liver disease or unexplained, persistent elevations in liver function tests (see WARNINGS).

*Pregnancy and lactation*: Atherosclerosis is a chronic process and discontinuation of lipid-lowering drugs during pregnancy should have little impact on the outcome of long-term therapy of primary hypercholesterolemia. Cholesterol and other products of cholesterol biosynthesis are essential components for fetal development (including synthesis of steroids and cell membranes). Since HMG-CoA reductase inhibitors decrease cholesterol synthesis and possibly the synthesis of other biologically active substances derived from cholesterol, they may cause fetal harm when administered to pregnant women. Therefore, HMG-CoA reductase inhibitors are contraindicated during pregnancy and in nursing mothers. **Pravastatin should be administered to women of childbearing age only when such patients are highly unlikely to conceive and have been informed of the potential hazards.** If the patient becomes pregnant while taking this class of drug, therapy should be discontinued and the patient apprised of the potential hazard to the fetus.

**WARNINGS**

**Liver Enzymes:** HMG-CoA reductase inhibitors, like some other lipid-lowering therapies, have been associated with biochemical abnormalities of liver function. Increases of serum transaminase (ALT, AST) values to more than 3 times the upper limit of normal occurring on 2 or more (not necessarily sequential) occasions have been reported in 1.3% of patients treated with pravastatin in the U.S. over an average period of 18 months. These abnormalities were not associated with cholestasis and did not appear to be related to treatment duration. In those patients in whom these abnormalities were believed to be related to pravastatin and who were discontinued from therapy, the transaminase levels usually fell slowly to pretreatment levels. These biochemical findings are usually asymptomatic although worldwide experience indicates that anorexia, weakness, and/or abdominal pain may also be present in rare patients.

As with other lipid-lowering agents, liver function tests should be performed during therapy with pravastatin. Serum aminotransferases, including ALT (SGPT), should be monitored before treatment begins, every six weeks for the first three months, every eight weeks during the remainder of the first year, and periodically thereafter (e.g., at about six-month intervals). Special attention should be given to patients who develop increased transaminase levels. Liver function tests should be repeated to confirm an elevation and subsequently monitored at more frequent intervals. If increases in AST and ALT equal or exceed three times the upper limit of normal and persist, then therapy should be discontinued. Persistence of significant aminotransferase elevations following discontinuation of therapy may warrant consideration of liver biopsy.

Active liver disease or unexplained transaminase elevations are contraindications to the use of pravastatin (see CONTRAINDICATIONS). Caution should be exercised when pravastatin is administered to patients with a history of liver disease or heavy alcohol ingestion (see CLINICAL PHARMACOLOGY, Pharmacokinetics/Metabolism). Such patients should be closely monitored, started at the lower end of the recommended dosing range, and titrated to the desired therapeutic effect.

**Skeletal Muscle: Rhabdomyolysis with renal dysfunction secondary to myoglobinuria has been reported with pravastatin and other drugs in this class.** Uncomplicated myalgia has also been reported in pravastatin-treated patients (see ADVERSE REACTIONS). Myopathy, defined as muscle aching or muscle weakness in conjunction with increases in creatine phosphokinase (CPK) values to greater than 10 times the upper limit of normal was reported to be possibly due to pravastatin in only one patient in clinical trials (<0.1%). Myopathy should be considered in any patient with diffuse myalgias, muscle tenderness or weakness, and/or marked elevation of CPK. Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever. **Pravastatin therapy should be discontinued if markedly elevated CPK levels occur or myopathy is diagnosed or suspected. Pravastatin therapy should also be temporarily withheld in any patient experiencing an acute or serious condition predisposing to the development of renal failure secondary to rhabdomyolysis, e.g., sepsis; hypotension; major surgery; trauma; severe metabolic, endocrine, or electrolyte disorders; or uncontrolled epilepsy.**

The risk of myopathy during treatment with lovastatin is increased if therapy with either cyclosporine, gemfibrozil, erythromycin, or niacin is administered concurrently. There is no experience with the use of pravastatin together with cyclosporine. Myopathy has not been observed in clinical trials involving small numbers of patients who were treated with pravastatin together with niacin. One trial of limited size involving combined therapy with pravastatin and gemfibrozil showed a trend toward more frequent CPK elevations and patient withdrawals due to musculoskeletal symptoms in the group receiving combined treatment as compared with the groups receiving placebo, gemfibrozil, or pravastatin monotherapy. Myopathy was not reported in this trial (see PRECAUTIONS, Drug Interactions). One patient developed myopathy when clofibrate was added to a previously well tolerated regimen of pravastatin; the myopathy resolved when clofibrate therapy was stopped and pravastatin treatment continued. **The use of fibrates alone may occasionally be associated with myopathy. The combined use of pravastatin and fibrates should generally be avoided.**

**PRECAUTIONS**

**General:** Pravastatin may elevate creatine phosphokinase and transaminase levels (see ADVERSE REACTIONS). This should be considered in the differential diagnosis of chest pain in a patient on therapy with pravastatin.

*Homozygous Familial Hypercholesterolemia*: Pravastatin has not been evaluated in patients with rare homozygous familial hypercholesterolemia. In this group of patients, it has been reported that HMG-CoA reductase inhibitors are less effective because the patients lack functional LDL receptors.

*Renal Insufficiency*: A single 20 mg oral dose of pravastatin was administered to 24 patients with varying degrees of renal impairment (as determined by creatinine clearance). No effect was observed on the pharmacokinetics of pravastatin or its 3α-hydroxy isomeric metabolite (SQ 31,906). A small increase was seen in mean AUC values and half-life ($t_{1/2}$) for the inactive enzymatic ring hydroxylation metabolite (SQ 31,945). Given this small sample size, the dosage administered, and the degree of individual variability, patients with renal impairment who are receiving pravastatin should be closely monitored.

**Information for Patients:** Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever.

**Drug Interactions:** *Immunosuppressive Drugs, Gemfibrozil, Niacin (Nicotinic Acid), Erythromycin*: See WARNINGS, Skeletal Muscle.

*Antipyrine*: Clearance by the cytochrome P450 system was unaltered by concomitant administration of pravastatin. Since pravastatin does not appear to induce hepatic drug-metabolizing enzymes, it is not expected that any significant interaction of pravastatin with other drugs (e.g., phenytoin, quinidine) metabolized by the cytochrome P450 system will occur.

*Cholestyramine/Colestipol*: Concomitant administration resulted in an approximately 40 to 50% decrease in the mean AUC of pravastatin. However, when pravastatin was administered 1 hour before or 4 hours after cholestyramine or 1 hour before colestipol and a standard meal, there was no clinically significant decrease in bioavailability or therapeutic effect (See DOSAGE AND ADMINISTRATION, Concomitant Therapy).

*Warfarin*: In a study involving 10 healthy male subjects given pravastatin and warfarin concomitantly for 6 days, bioavailability parameters at steady state for pravastatin (parent compound) were not altered. Pravastatin did not alter the plasma protein-binding of warfarin. Concomitant dosing did increase the AUC and Cmax of warfarin but did not produce any changes in its anticoagulant action (i.e., no increase was seen in mean prothrombin time after 6 days of concomitant therapy). However, bleeding and extreme prolongation of prothrombin time has been reported with another drug in this class. Patients receiving warfarin-type anticoagulants should have their prothrombin times closely monitored when pravastatin is initiated or the dosage of pravastatin is changed.

*Cimetidine*: The $AUC_{0\text{-}12hr}$ for pravastatin when given with cimetidine was not significantly different from the AUC for pravastatin when given alone. A significant difference was observed between the AUC's for pravastatin when given with cimetidine compared to when administered with antacid.

*Digoxin*: In a crossover trial involving 18 healthy male subjects given pravastatin and digoxin concurrently for 9 days, the bioavailability parameters of digoxin were not affected. The AUC of pravastatin tended to increase, but the overall bioavailability of pravastatin plus its metabolites SO 31,906 and SO 31,945 was not altered.

*Gemfibrozil*: In a crossover study in 20 healthy male volunteers given concomitant single doses of pravastatin and gemfibrozil, there was a significant decrease in urinary excretion and protein binding of pravastatin. In addition, there was a significant increase in AUC, Cmax, and Tmax for the pravastatin metabolite SO 31,906. Combination therapy with pravastatin and gemfibrozil is generally not recommended.

In interaction studies with *aspirin, antacids* (1 hour prior to PRAVACHOL), *cimetidine, nicotinic acid*, or *probucol*, no statistically significant differences in bioavailability were seen when PRAVACHOL (pravastatin sodium) was administered.

*Other Drugs*: During clinical trials, no noticeable drug interactions were reported when PRAVACHOL was added to diuretics, antihypertensives, digitalis, converting-enzyme inhibitors, calcium channel blockers, beta-blockers, or nitroglycerin.

**Endocrine Function:** HMG-CoA reductase inhibitors interfere with cholesterol synthesis and lower circulating cholesterol levels and, as such, might theoretically blunt adrenal or gonadal steroid hormone production. Results of clinical trials with pravastatin in males and post-menopausal females were inconsistent with regard to possible effects of the drug on basal steroid hormone levels. In a study of 21 males, the mean testosterone response to human chorionic gonadotropin was significantly reduced ($p<0.004$) after 16 weeks of treatment with 40 mg of pravastatin. However, the percentage of patients showing a ≥50% rise in plasma testosterone after human chorionic gonadotropin stimulation did not change significantly after therapy in these patients. The effects of HMG-CoA reductase inhibitors on spermatogenesis and fertility have not been studied in adequate numbers of patients. The effects, if any, of pravastatin on the pituitary-gonadal axis in pre-menopausal females are unknown. Patients treated with pravastatin who display clinical evidence of endocrine dysfunction should be evaluated appropriately. Caution should also be exercised if an HMG-CoA reductase inhibitor or other agent used to lower cholesterol levels is administered to patients also receiving other drugs (e.g., ketoconazole, spironolactone, cimetidine) that may diminish the levels or activity of steroid hormones.

**CNS Toxicity:** CNS vascular lesions, characterized by perivascular hemorrhage and edema and mononuclear cell infiltration of perivascular spaces, were seen in dogs treated with pravastatin at a dose of 25 mg/kg/day, a dose that produced a plasma drug level about 50 times higher than the mean drug level in humans taking 40 mg/day. Similar CNS vascular lesions have been observed with several other drugs in this class.

A chemically similar drug in this class produced optic nerve degeneration (Wallenian degeneration of retinogeniculate fibers) in clinically normal dogs in a dose-dependent fashion starting at 60 mg/kg/day, a dose that produced mean plasma drug levels about 30 times higher than the mean drug level in humans taking the highest recommended dose (as measured by total enzyme inhibitory activity). This same drug also produced vestibulocochlear Wallerian-like degeneration and retinal ganglion cell chromatolysis in dogs treated for 14 weeks at 180 mg/kg/day, a dose which resulted in a mean plasma drug level similar to that seen with the 60 mg/kg dose.

**Carcinogenesis, Mutagenesis, Impairment of Fertility**: In a 2 year study in rats fed pravastatin at doses of 10, 30, or 100 mg/kg body weight, there was an increased incidence of hepatocellular carcinomas in males at the highest dose ($p<0.01$). Although rats were given up to 125 times the human dose (HD) on a mg/kg body weight basis, their serum drug levels were only 6 to 10 times higher than those measured in humans given 40 mg pravastatin as measured by AUC.

The oral administration of 10, 30, or 100 mg/kg (producing plasma drug levels approximately 0.5 to 5.0 times human drug levels at 40 mg) of pravastatin to mice for 22 months resulted in a statistically significant increase in the incidence of malignant lymphomas in treated females when all treatment groups were pooled and compared to controls ($p<0.05$). The incidence was not dose-related and male mice were not affected.

A chemically similar drug in this class was administered to mice for 72 weeks at 25, 100, and 400 mg/kg body weight, which resulted in mean serum drug levels approximately 3, 15, and 33 times higher than the mean human serum drug concentration (as total inhibitory activity) after a 40 mg oral dose. Liver carcinomas were significantly increased in high-dose females and mid- and high-dose males, with a maximum incidence of 90 percent in males. The incidence of adenomas of the liver was significantly increased in mid- and high-dose females. Drug treatment also significantly increased the incidence of lung adenomas in mid- and high-dose males and females. Adenomas of the eye Harderian gland (a gland of the eye of rodents) were significantly higher in high-dose mice than in controls.

No evidence of mutagenicity was observed *in vitro*, with or without rat-liver metabolic activation, in the following studies: microbial mutagen tests, using mutant strains of *Salmonella typhimurium* or *Escherichia coli*, a forward mutation assay in L5178Y TK +/− mouse lymphoma cells, a chromosomal aberration test in hamster cells, and a gene conversion assay using *Saccharomyces cerevisiae*. In addition, there was no evidence of mutagenicity in either a dominant lethal test in mice or a micronucleus test in mice.

In a study in rats, with daily doses up to 500 mg/kg, pravastatin did not produce any adverse effects on fertility or general reproductive performance. However, in a study with another HMG-CoA reductase inhibitor, there was decreased fertility in male rats treated for 34 weeks at 25 mg/kg body weight, although this effect was not observed in a subsequent fertility study when this same dose was administered for 11 weeks (the entire cycle of spermatogenesis, including epididymal maturation). In rats treated with this same reductase inhibitor at 180 mg/kg/day, seminiferous tubule degeneration (necrosis and loss of spermatogenic epithelium) was observed. Although not seen with pravastatin, two similar drugs in this class caused drug-related testicular atrophy, decreased spermatogenesis, spermatocytic degeneration, and giant cell formation in dogs. The clinical significance of these findings is unclear.

**Pregnancy: Pregnancy Category X:** See CONTRAINDICATIONS.

Safety in pregnant women has not been established. Pravastatin was not teratogenic in rats at doses up to 1000 mg/kg daily or in rabbits at doses of up to 50 mg/kg daily. These doses resulted in 20× (rabbit) or 240× (rat) the human exposure based on surface area (mg/meter$^2$). However, in studies with another HMG-CoA reductase inhibitor, skeletal malformations were observed in rats and mice. PRAVACHOL (pravastatin sodium) should be administered to women of child-bearing potential only when such patients are highly unlikely to conceive and have been informed of the potential hazards. If the woman becomes pregnant while taking PRAVACHOL (pravastatin sodium), it should be discontinued and the patient advised again as to the potential hazards to the fetus.

**Nursing Mothers:** A small amount of pravastatin is excreted in human breast milk. Because of the potential for serious adverse reactions in nursing infants, women taking PRAVACHOL should not nurse (see CONTRAINDICATIONS).

**Pediatric Use:** Safety and effectiveness in individuals less than 18 years old have not been established. Hence, treatment in patients less than 18 years old is not recommended at this time. (See also PRECAUTIONS, **General**.)

**ADVERSE REACTIONS**

Pravastatin is generally well tolerated; adverse reactions have usually been mild and transient. In 4-month long placebo-controlled trials, 1.7% of pravastatin-treated patients and 1.2% of placebo-treated patients were discontinued from treatment because of adverse experiences attributed to study drug therapy; this difference was not statistically significant. In long-term studies, the most common reasons for discontinuation were asymptomatic serum transaminase increases and mild, non-specific gastrointestinal complaints. During clinical trials the overall incidence of adverse events in the elderly was not different from the incidence observed in younger patients.

**Adverse Clinical Events:** All adverse clinical events (regardless of attribution) reported in more than 2% of pravastatin-treated patients in the placebo-controlled trials are identified in the table below; also shown are the percentages of patients in whom these medical events were believed to be related or possibly related to the drug.

| | All Events % | | Events Attributed to Study Drug % | |
|---|---|---|---|---|
| Body System/Event | Pravastatin (N = 900) | Placebo (N = 411) | Pravastatin (N = 900) | Placebo (N = 411) |
| Cardiovascular | | | | |
| Cardiac Chest Pain | 4.0 | 3.4 | 0.1 | 0.0 |
| Dermatologic | | | | |
| Rash | 4.0* | 1.1 | 1.3 | 0.9 |
| Gastrointestinal | | | | |
| Nausea/Vomiting | 7.3 | 7.1 | 2.9 | 3.4 |
| Diarrhea | 6.2 | 5.6 | 2.0 | 1.9 |
| Abdominal Pain | 5.4 | 6.9 | 2.0 | 3.9 |
| Constipation | 4.0 | 7.1 | 2.4 | 5.1 |
| Flatulence | 3.3 | 3.6 | 2.7 | 3.4 |
| Heartburn | 2.9 | 1.9 | 2.0 | 0.7 |
| General | | | | |
| Fatigue | 3.8 | 3.4 | 1.9 | 1.0 |
| Chest Pain | 3.7 | 1.9 | 0.3 | 0.2 |
| Influenza | 2.4* | 0.7 | 0.0 | 0.0 |
| Musculoskeletal | | | | |
| Localized Pain | 10.0 | 9.0 | 1.4 | 1.5 |
| Myalgia | 2.7 | 1.0 | 0.6 | 0.0 |
| Nervous System | | | | |
| Headache | 6.2 | 3.9 | 1.7* | 0.2 |
| Dizziness | 3.3 | 3.2 | 1.0 | 0.5 |
| Renal/Genitourinary | | | | |
| Urinary Abnormality | 2.4 | 2.9 | 0.7 | 1.2 |
| Respiratory | | | | |
| Common Cold | 7.0 | 6.3 | 0.0 | 0.0 |
| Rhinitis | 4.0 | 4.1 | 0.1 | 0.0 |
| Cough | 2.6 | 1.7 | 0.1 | 0.0 |

*Statistically significantly different from placebo.

The following effects have been reported with drugs in this class:

*Skeletal*: myopathy, rhabdomyolysis.

*Neurological*: dysfunction of certain cranial nerves (including alteration of taste, impairment of extra-ocular movement, facial paresis), tremor, vertigo, memory loss, paresthesia, peripheral neuropathy, peripheral nerve palsy.

*Hypersensitivity Reactions*: An apparent hypersensitivity syndrome has been reported rarely which has included one or more of the following features: anaphylaxis, angioedema, lupus erythematous-like syndrome, polymyalgia rheumatica, vasculitis, purpura, thrombocytopenia, leukopenia, hemolytic anemia, positive ANA, ESR increase, arthritis, arthralgia, urticaria, asthenia, photosensitivity, fever, chills, flushing, malaise, dyspnea, toxic epidermal necrolysis, erythema multiforme, including Stevens-Johnson syndrome.

*Gastrointestinal*: pancreatitis, hepatitis, including chronic active hepatitis, cholestatic jaundice, fatty change in liver, and, rarely, cirrhosis, fulminant hepatic necrosis, and hepatoma, anorexia, vomiting.

*Reproductive*: gynecomastia, loss of libido, erectile dysfunction.

*Eye*: progression of cataracts (lens opacities), ophthalmoplegia.

**Laboratory Test Abnormalities:** Increases in serum transaminase (ALT, AST) values and CPK have been observed (see WARNINGS).

Transient, asymptomatic eosinophilia has been reported. Eosinophil counts usually returned to normal despite continued therapy. Anemia, thrombocytopenia, and leukopenia have been reported with other HMG-CoA reductase inhibitors.

**Concomitant Therapy:** Pravastatin has been administered concurrently with cholestyramine, colestipol, nicotinic acid, probucol and gemfibrozil. Preliminary data suggest that the addition of either probucol or gemfibrozil to therapy with lovastatin or pravastatin is **not** associated with greater reduction in LDL cholesterol than that achieved with lovastatin or pravastatin alone. No adverse reactions unique to the combination or in addition to those previously reported for each drug alone have been reported. Myopathy and rhabdomyolysis (with or without acute renal failure) have been reported when another HMG-CoA reductase inhibitor was used in combination with immunosuppressive drugs, gemfibrozil, erythromycin, or lipid-lowering doses of nicotinic acid. Concomitant therapy with HMG-CoA reductase inhibitors and these agents is generally not recommended. (See WARNINGS, **Skeletal Muscle** and PRECAUTIONS, **Drug Interactions.**)

**OVERDOSAGE**

There have been no reports of overdoses with pravastatin.

Should an accidental overdose occur, treat symptomatically and institute supportive measures as required. (J4-422A)

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D3-K004

Issued March 1993

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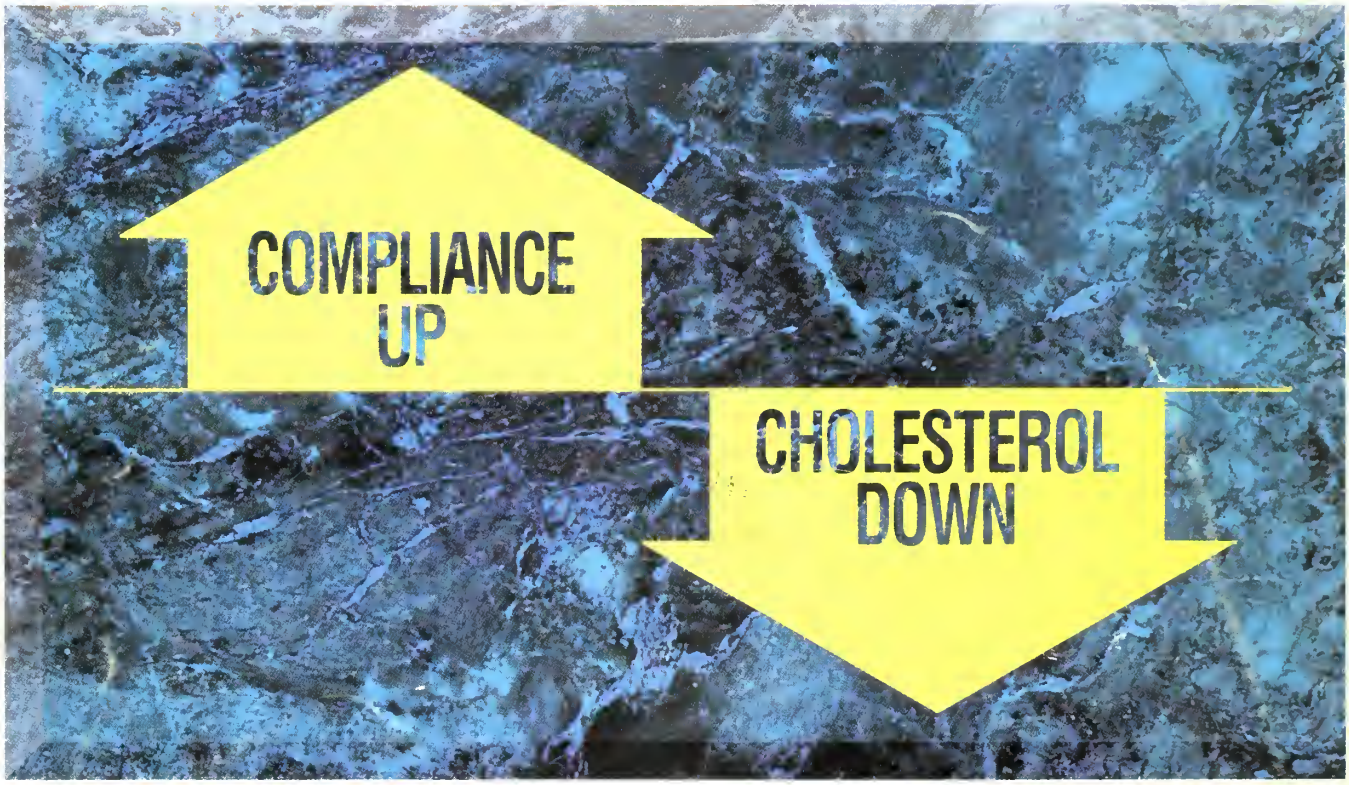


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*Please see following page for brief summary of full Prescribing Information.*